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Please distribute to the following:

100/300 AREA UNIT MANAGER MEETING
ATTENDANCE AND DISTRIBUTION

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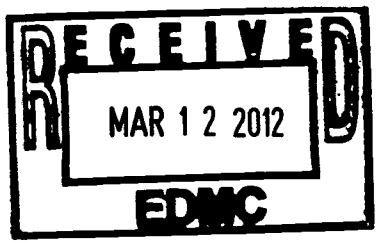
Lewis, Jacquie	jllewis@wch-rcc.com	H4-21	WCH



164471

100/300 AREA UNIT MANAGERS MEETING
APPROVAL OF MEETING MINUTES

January 12, 2012

APPROVAL: _____ Date 2/9/12

Mark French, DOE/RL (A3-04)
River Corridor Project Manager

APPROVAL: _____ Date 2/9/12

Brian Charboneau, DOE/RL (A6-33)
Groundwater Project Manager

APPROVAL: _____ Date 2/9/12

Nina Menard. Ecology (H0-57)
Environmental Restoration Project
Manager

APPROVAL: _____ Date 2/9/12

Laura Buelow, Rod Lobos, or Christopher
Guzzetti, EPA (B1-46)
100 Area Project Manager

APPROVAL: _____ Date Feb 9 2012

Larry Gadbois, EPA
(B1-46)
300 Area Project Manager

100 & 300 AREA UNIT MANAGER MEETING MINUTES

Groundwater and Source Operable Units; Facility Deactivation, Decontamination, Decommission, and Demolition (D4); Interim Safe Storage (ISS); Field Remediation (FR); and Mission Completion

January 12, 2012

ADMINISTRATIVE

- Next Unit Manager Meeting (UMM) – The next meeting will be held February 9, 2012, at the Washington Closure Hanford (WCH) Office Building, 2620 Fermi Avenue, Room C209.
- Attendees/Delegations – Attachment A is the list of attendees. Representatives from each agency were present to conduct the business of the UMM.
- Approval of Minutes – The December 8, 2011, meeting minutes were approved by the U.S. Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and U.S. Department of Energy, Richland Operations Office (RL).
- Action Item Status – The status of action items was reviewed and updates were provided (see Attachment B).
- Agenda – Attachment C is the meeting agenda.

EXECUTIVE SESSION (Tri-Parties Only)

An Executive Session was not held by RL, EPA, and Ecology prior to the January 12, 2012, UMM.

100-K AREA REMEDIATION PROJECT MANAGERS MEETING

Portions of the 100-K Area Remediation Project Managers Meeting were added to the 100/300 Area UMM agenda beginning in January 12, 2012. Attachment 1 provides status and information for the activities. No issues were identified and no agreements or action items were documented.

100-F & 100-IU-2/100-IU-6 AREAS (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. Attachment 3 provides status and information for Field Remediation activities. No issues were identified and no agreements or action items were documented.

100-D & 100-H AREAS (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. Attachment 3 provides status and information for Field Remediation activities. No issues were identified and no action items were documented.

Agreement 1: Attachment 4 provides Ecology's approvals for use of staging areas at the 100-D-100 and 116-H-5 site. Ecology also acknowledges receiving information that the staging piles at 116-H-5 are no longer in use, all waste has been removed, and that information closing the staging pile areas has been included in the RSVP for the 116-H-5 waste site that Ecology is currently reviewing.

Agreement 2: Attachment 5 provides Ecology's concurrence that a camera and light can be used to remotely perform the necessary weekly inspections of the two NaK specimens stored in the shielded bunker at 100-D to meet the goal of keeping exposures to workers as low as reasonably achievable.

Agreement 3: Attachment 6 provides the "Treatment Plan for 100-D Burial Grounds NaK" approved by DOE and Ecology.

Agreement 4: Attachment 7 provides Ecology's approval of the staging piles and sampling strategy for 100-D-30 remediation as shown on the Tier 2 Excavation Plan drawing 0100D-DD-C0735.

Agreement 5: Attachment 8 provides Ecology's concurrence on the logic for selection of potholes for 100-D-100 as well as the sampling approach.

100-N AREA (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. Attachment 3 provides status and information for Field Remediation activities. Attachment 9 provides status and information for D4/ISS activities at 100-N. No issues were identified.

Action Item 1: At the next UMM, DOE will discuss the potential sources of total organic carbon detected at well 199-N-165 down-gradient from the 1324-N/NA treatment, storage, and/or disposal units.

Agreement 1: Attachment 10 provides concurrence by DOE and Ecology with the colonization plan for 100-N-61 and 100-N-64.

Agreement 2: Attachment 11 provides the "Ex-Situ Bioremediation Plan Treatment Evaluation Summary for Shallow Petroleum Waste Sites at 100-N."

100-K AREA (GROUNDWATER, SOILS)

Attachment 2 provides status and information for groundwater. Attachment 3 provides status and information for Field Remediation activities. No issues were identified and no agreements or action items were documented.

100-B/C AREA (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. Attachment 3 provides status and information for Field Remediation activities. No issues were identified and no agreements or action items were documented.

300 AREA – 618-10/11 (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. No issues were identified and no agreements or action items were documented.

300 AREA - GENERAL (GROUNDWATER, SOILS, D4/ISS)

Attachment 2 provides status and information for groundwater. Attachment 12 provides status of the 300 Area Closure Project activities. No issues were identified and no agreements or action items were documented.

REGULATORY CLOSEOUT DOCUMENTS OVERALL SCHEDULE

No issues were identified and no agreements or action items were documented.

MISSION COMPLETION PROJECT

Attachment 13 provides status and information regarding the Orphan Sites Evaluations, Long-Term Stewardship, River Corridor Baseline Risk Assessment, the Remedial Investigation of Hanford Releases to the Columbia River, and a Document Review Look-Ahead. No issues were identified and no agreements or action items were documented.

5-YEAR RECORD OF DECISION ACTION ITEM UPDATE

No changes were reported to the status of the CERCLA Five-Year Review action Items. No issues were identified and no agreements or action items were documented.

Attachment A

100/300 AREA UNIT MANAGER MEETING
ATTENDANCE AND DISTRIBUTION
January 12, 2012

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Attachment B

100/300 Area UMM
Action List
January 12, 2012

Open (O)/ Closed (X)	Action No.	Co.	Actionee	Project	Action Description	Status
O	100-181	RL	J. Hanson	100-HR	DOE will provide Ecology with a briefing on the applicability and status of bioremediation of chromium and the associated feasibility studies.	Open: 4/14/11; Action:
O	100-192	RL	J. Hanson	100D	DOE will provide Ecology with a briefing on the wells damaged by the flooding at 100-D.	Open: 12/8/11; Action:

Attachment C

100/300 Area Unit Manager Meeting
January 12, 2012
Washington Closure Hanford Building
2620 Fermi Avenue, Richland, WA 99354
Room C209; **2:00p.m. (NEW START TIME)**

Administrative:

- Approval and signing of previous meeting minutes (December 8, 2011)
- Update to Action Items List
- Next UMM (2/9/2012, Room C209)

Open Session: Project Area Updates - Groundwater, Field Remediation, D4/ISS:

- 100K D4/ISS project (Ellen Dagan, Steve Balone, Tom Teynor)
- 100-F & 100-IU-2/6 Areas (Greg Sinton/Tom Post/Jamie Zeisloft)
- 100-D & 100-H Areas (Jim Hanson/Tom Post/Joanne Chance)
- 100-N Area (Joanne Chance, Rudy Guercia, Mike Thompson)
- 100-K Area (Jim Hanson, Jamie Zeisloft)
- 100-B/C Area (Greg Sinton, Tom Post)
- 300 Area - 618-10/11 exclusively (Jamie Zeisloft)
- 300 Area (Mike Thompson/Rudy Guercia)
- Regulatory Closeout Documents Overall Schedule (John Neath, Mike Thompson)
- Mission Completion Project (John Sands)

Special Topics/Other

- 5-Year Record of Decision Action Item Update (Jim Hanson)

Adjourn

Attachment 1

ATTACHMENT 2
100K AREA REMEDIATION PROJECT MANAGERS MEETING MILESTONE STATUS

January 12, 2012

M-016-53 Complete the interim response actions for the 100 K Area within the perimeter boundary and to the river for Phase 1 actions.
Due 12/31/2012, DOE Lead Ellen Dagan

Remedial Actions:

- Continued remediation at waste site 100-K-102 with the removal of the pipeline. Completion of the remediation at waste site 100-K-102 will allow closure of the following phase 1 waste sites: 100-K-18, 100-K-19, 100-K-34, 120-KW-5, 120-KW-7 and 1607-K3.
- Presented DOE-RL and EPA with the data from the 10 additional DPTs under the 105-KE Reactor.
- The RSVP for the 100-K-63 is being drafted and interim re-vegetation is being pursued.
- The VSI for Area AG, Zone 2 was submitted to DOE-RL and EPA for review.

Schedule Status: On schedule.

Agreements, Commitments and Actions:

DOE and EPA will continue to meet to discuss facility demolition and waste site remediation scheduling per the integrated schedule revisions. To be scheduled by mid December.

DOE brief EPA on DPT results under the 105-KE reactor.

DOE provide EPA the cultural resource meeting schedule.

DOE will develop and provide a recommendation to EPA on the path forward for closure of Phase 1 waste sites in and around the KW Head House with respect to future revegetation of the area.

M-016-143 Complete the interim response actions for the 100 K Area within the perimeter boundary and to the river for Phase 2 actions.
Due 12/31/2015, DOE Lead Ellen Dagan/Steve Balone

- Continued remediation at waste site 100-K-102 with the removal of the pipeline. Completion of the remediation at waste site 100-K-102 will allow closure of the following phase 2 waste sites: 100-K-97 and 100-K-102.
- An MOA for remediation work on the 100-K Eastern floodplain at 100-K-80, 100-K-81, 100-K-83, and 100-K-96 waste sites is under review by DOE and the Tribes.

Schedule Status: On schedule.

Agreements, Commitments and Actions:

M-016-00C Complete All Response Actions in The 100 K Area
Due 12/31/2020, DOE Lead Tom Teynor

- Demolition of 190-KW is complete.
- Asbestos removal at 165-KE and 105-KE water tunnel.
- Demolition of 183.2 KE was not worked, remains 35% complete.

Schedule Status: On schedule.

Agreements, Commitments and Actions:

MILESTONE	DESCRIPTION	DUE DATE	DOE LEAD	SCHEDULE STATUS
M-016-186	Initiate Soil Remediation Under 105KW Fuel Storage Basin	12/31/2019	Steve Balone	On Schedule

100K Area Removal Action Status (January 12, 2012)

Phase 1 M-016-053: December 31, 2012	Phase 2 M-016-143: December 31, 2015	Phase 3 (M-016-00C: December 31, 2020)
110KW Gas Storage Facility	115KW Gas Recirculation Building	105KW Water Tunnel
110KE Gas Storage Facility	116KW Reactor Exhaust Stack	142K CVDF
115KE Gas Recirculation Building	117KW Exhaust Air Filter Building	1506K1 Fiber Optics Hut
116KE Reactor Exhaust Stack	118KW Horizontal Control Rod Storage Cave	165KE Power Control Bldg
117KE Exhaust Air Filter Building	119KW Exhaust Air Sampling Building	142KA CVDF Generator Bldg
118KE Horizontal Control Rod Storage Cave	166AKE Oil Storage Facility	165KW Power Control Bldg
119KE Exhaust Air Sampling	166KE Oil Storage Vault	167K Cross-tie Tunnel Bldg
1706KE Radiation Control Counting Lab	166KW Oil Storage Vault	1717K Maintenance Shop
1706KEL Developmental Lab	1705KE Effluent Water Treatment Pilot Plant	1724K Maintenance Shop
1706KER Water Studies Recirculation Bldg	1713KER Shop Building	1724KA Storage Shed
1713KE Warehouse	1713KW Warehouse	181KW River Pump House
1714KE Oil and Paint Storage Shed	1714KW Oil and Paint Storage Shed	183KE Chlorine Vault
183.4KW Clearwell	1720K Administration Office Building	183.2KE Sedimentation Basin
183.1KW Head House	1724KB Gas Bottle Storage Facility	183.3KE Filter Basin
181KE River Pump House	182K Emergency Water Reservoir Pump House	183.4KE Clearwell
183.2KW Sedimentation Basin	183.5KW Lime Feeder Building	183.1KE Headhouse
183.3KW Filter Basin	183.6KW Lime Feeder Building	183.5KE Lime Feeder
MO048 Construction Lunch Trailer	MO101 Administration	183.6KE Lime Feeder
MO060 Conference Trailer	MO102 Administration	185K Potable Water Treatment Plant
MO872 Leased trailer	MO214 Administration	1908K Outfall Structure
MO873 Leased trailer	MO382 Office	1908KE Outfall Structure
MO969 HPT Change Trailer	MO401 Administration	190KE Main Pump House
1605KE Guard Tower East	MO402 Administration	190KW Main Pump House
	MO442 Classroom/Office	MO054 Construction Lunch Room
	MO506 CVDF Lunch Room	MO500 Administration
	MO507 CVDF Conference Room	MO236 KW Ops/HPT Change
	MO907 Administration	MO237 KW Construction Forces
	MO917 CVDF Administration	MO323 CVD Change Trailer
	MO928 Administration	MO955 Conference Room
		1605KW Guard Tower West

Field Work In Progress

Demolition Complete

Closure Actions and Documentation Complete

100K Area Waste Site Remediation Status

January 12, 2012

Phase 1 M-016-053: 12/31/2012		Phase 2 M-016-143: 12/31/2015		Phase 3 M-016-00C: 12/31/2020	M-016-57 (Initiate soil remediation at K East Basin)	Legend
100-K-3	100-K-71	100-K-1	120-KW-6	100-K-35	UPR-100-K-1	Excavation ongoing/ Additional remediation needed
100-K-6	100-K-77	100-K-4	126-KE-2	100-K-43		
100-K-18	116-KE-1	100-K-5	130-K-2	100-K-47		
100-K-19	116-KE-3	100-K-13	130-KE-2	100-K-55		Failed CSNA
100-K-34	116-KE-6A	100-K-14	130-KW-1	100-K-56		
100-K-36	116-KE-6B	100-K-25	130-KW-2	100-K-72		Mixed Failed CSNA and RTD
100-K-37	116-KE-6C	100-K-27	132-KW-1	100-K-73		
100-K-38	116-KE-6D	100-K-48	1607-K1	100-K-74		Drafting VSI/Collecting Samples
100-K-46	118-KE-2	100-K-49	1607-K2	100-K-75		
100-K-53	120-KW-1	100-K-54	1607-K4	100-K-79		Drafting RSVP
100-K-56	120-KW-2	100-K-56	1607-K5	100-K-80		RSVP approved
100-K-57	120-KW-3	100-K-60	1607-K6	100-K-81		
100-K-62	120-KW-4	100-K-61	100-K-94	100-K-82		Backfill complete
100-K-63	120-KW-5	100-K-66	100-K-96	116-K-3		Revegetation complete
100-K-64	120-KW-7	100-K-67	100-K-97	116-KE-2		
100-K-68	130-KE-1	100-K-83	100-K-100	116-KW-2		
100-K-69	132-KE-1	116-KW-1	100-K-101	118-KW-1		Waste site listing is based on DOE/RL-97-16 TPA-CN-412
100-K-70	1607-K3	118-KW-2	100-K-102			
		120-KE-1	100-K-103			
		120-KE-2	100-K-104			
		120-KE-3	100-K-105			
		120-KE-4	100-K-106			
		120-KE-5	100-K-107			
		120-KE-6	100-K-108			
		120-KE-8	100-K-109			
		120-KE-9	100-K-110			

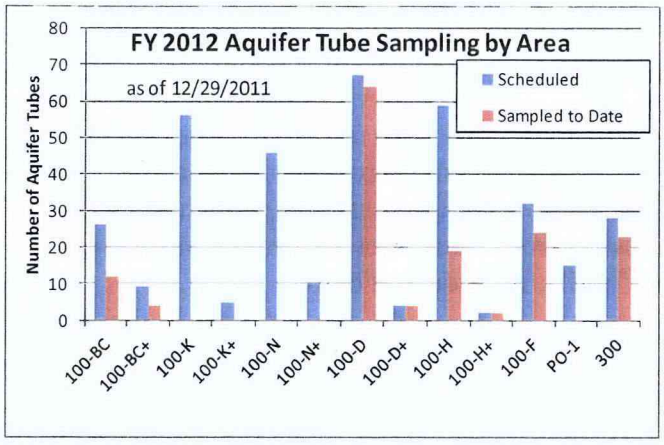
Attachment 2

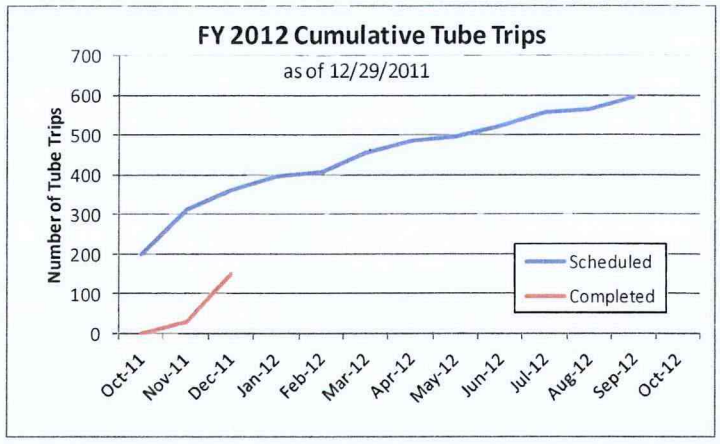
100/300 Areas Unit Managers Meeting
January 12, 2012

General information on Aquifer Tube Sampling

The comprehensive, annual sampling event for FY 2012 was scheduled for October through December. Sampling began in November and continued in December. Relative priority for aquifer tube sampling was set so that tubes that were not sampled in FY 2011 (100-BC, 100-F, Hanford Town Site, and fall event in 300 Area) get highest priority. However, higher river stage in December prevented sampling some tubes, so sampling progressed to locations where the tubes are extended onto the bank for access at higher river stages (e.g., 100-D). Recovery efforts include OT for current crews and consideration of additional crews.

The graph on the left shows numbers of individual aquifer tubes scheduled and sampled in each shore segment. The graph on the right shows the total number of aquifer tube sampling *trips* (some tubes are sampled multiple times in a year).





General information on Groundwater Sampling

The sampling organization reported delays in obtaining CERCLA groundwater samples scheduled for October. The wells completed successfully are reported in a table on the last page of this handout. Primary contributors to delays include the large number of samples scheduled during October, drilling activities continuing into FY 2012, and laboratory issues being resolved at WSCF. CHPRC is working to resolve the backlog, the sampling should significantly recover, since WSCF issues were resolved and drilling is complete. CHPRC is looking for additional ways to enhance the recovery.

100-FR-3 Groundwater Operable Unit – Bert Day / Mary Hartman

(M-015-64-T01, 12/17/2011, Submit CERCLA RI/FS Report and Proposed Plan for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units for groundwater and soil.)
Schedule Status - The new planned delivery date for the 100-FIU Draft A RI/FS Report to the regulators is currently being re-evaluated based on 100-K comments. Field investigations are complete.

RI/FS & PP: Activities continue on the document development. Team is currently planning an alternative workshop in late January for both BC and F.

Twenty-six wells were sampled in November and December (delayed from October). This completed the comprehensive, annual sampling event. Most of the data have been loaded into HEIS and the rest are expected in the coming month. Three wells near F reactor building are scheduled for semiannual sampling.

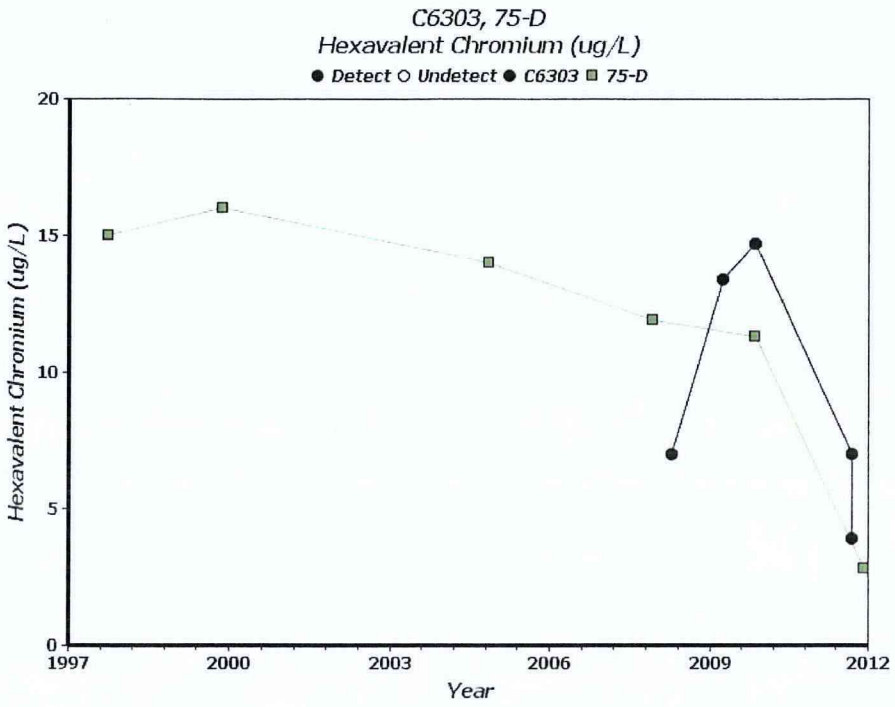
Hexavalent chromium concentrations in December were generally on trend with fall 2010 results, with the exception of one anomalously low result that did not agree with total chromium results and is under review. Only two wells had dissolved chromium concentrations above 20 µg/L, and the plume map will look very similar to 2010. Nitrate, strontium-90, and TCE results from December also were consistent with 2010 data with some exceptions in the new "temporary" wells, as discussed below.

Groundwater samples were collected from the two former vadose boreholes that were completed as PVC wells, which are scheduled for semiannual sampling in FY 2012. Highlights of the data are tabulated and discussed below.

Constituent	December 2011 Result	Post-development Characterization Data (March 2011)
199-F5-55 (116-F-14 Retention Basins)		
Hexavalent chromium	U	U
Nitrate	50.5 mg/L	none
Strontium-90	270 pCi/L	285 pCi/L
Uranium	4.95 µg/L	none
199-F5-56 (Reactor Building)		
Hexavalent chromium	U	4 µg/L (flagged B)
Nitrate	201 mg/L	none
Strontium-90	80 pCi/L	23.7 pCi/L
Uranium	34.7 µg/L	None
U = undetected B = near detection limit		

Strontium-90 concentrations in well 199-F-55 are the highest in 100-F. The well is located in the known footprint of the strontium-90 plume. This is currently the only well near the 116-F-14 retention basins, but nearby, decommissioned well 199-F5-3 had similarly high strontium-90 concentrations in the mid-1990s. Wells between 199-F5-55 and the river had no detectable strontium-90 in December. The nitrate, hexavalent chromium, and uranium results from well 199-F5-55 were consistent with data from nearby wells. TCE was undetected.

Well 199-F5-56, near the reactor building, had higher strontium-90 results than were detected in characterization sampling. Nearby wells have much lower Sr-90 concentrations (below DWS or below detection limit). Nitrate concentrations were somewhat higher in well 199-F-56 than in nearby wells. Uranium exceeded the DWS; this was the only well in 100-F to exceed the standard. Uranium was not identified as a COPC in the 100-F work plan, but is monitored in numerous wells under the routine groundwater SAP. Uranium concentrations in nearby well 199-F5-47 was 12.2 µg/L in December (on trend with recent data). TCE was undetected in well 199-F5-56.



Twenty-four of 32 aquifer tubes along the 100-F shoreline segment were sampled in November or early December 2011. Two additional tubes were sampled in September 2011. So far, only hexavalent chromium data have been received for most of the tubes. Concentrations were all <10 µg/L, including the two tubes where concentrations previously exceeded that level. Tube C6303 is located near the 100-F chromium plume; tube 75-D is located far downstream.

100-HR-3 Groundwater Operable Unit – Bert Day / John Smoot

(M-15-70-T01, 11/24/2011, Submit feasibility study report and proposed plan for the 100-HR-1, 100-HR-2, 100-HR-3, 100-DR-1 and 100-DR-2 operable units for groundwater and soil.)
Schedule Status - The new planned delivery date for the 100-D/H Draft A RI/FS Report to the regulators is currently being re-evaluated based on 100-K comments. Slug tests for the RI wells were completed in December and these data are being analyzed.

(M-16-111C, Expand current pump-and-treat system at 100-HR-3 operable unit utilizing ex situ treatment, in situ treatment or a combination of both to a total 800 gpm capacity or as specified in the work plan.)
Schedule Status – Completed 9/29/2011 with the startup of HX facility. Currently HR-3 Operable Unit pump and treat systems are running at a combined treatment rate of approximately 1050 gpm. Milestone is complete based on letter from R to Ecology dated December 14, 2011, (12-AMCP-0036).

- DX Pump and Treat system
  - For the period December 1 through 31, 2011:
    - The system treated 22 million gallons.
    - Average treatment rate: 500 gpm
    - The system removed 68 kg of hexavalent chromium.
  - Design modifications are being prepared to protect the four wells on the flood plain from damage in future high water events. Work packages are being prepared to repair the wells and return them to service.

- HX Pump and Treat System,
  - Operational Testing is complete (12/13) and the facility is now released for unrestricted operations.
  - December 1 through 31, 2011 performance:
    - The system treated 27 million gallons.
    - Average treatment rate: 609 gpm
    - The system removed 3.7 kg of hexavalent chromium
- HR-3 Treatment System was placed in cold standby on May 5, 2011.
- DR-5 Treatment System was placed in cold standby on February 28, 2011.
- ISRM Pond
  - This topic was discussed at the November IAMIT meeting; follow-on discussions scheduled at the January IAMIT meeting.
- RI/FS Activities
  - Slug testing for the HR-3 RI/FS wells is complete and the data are being analyzed.
  - A Borehole Summary Report is being prepared for the final RI well 199-D5-144 (C8668)
  - Continue incorporation of RL comments on the RI/FS Report

Sixty-four of 67 aquifer tubes along the 100-D shore segment were sampled in December 2011. The others did not yield water or were broken. Twenty-one of 59 tubes on the 100-H segment were sampled in late December; sampling will continue in January.

100-NR-2 Groundwater Operable Unit – Bert Day / Deb Alexander

(M-015-62-T01, 9/17/2012, Submit a Feasibility Study [FS] Report and Proposed Plan [PP] for the 100-NR-1 and 100-NR-2 Operable Units including groundwater and soil. The FS Report and PP will evaluate the permeable reactive barrier technology and other alternatives (petroleum remediation) and will identify a preferred alternative in accordance with CERCLA requirements.)
Schedule Status – Behind schedule. Field investigations are now complete with all well-drilling/sampling work completed in September (discussed further below).

- RI/FS Activities
  - Work has begun on the composite geophysical logs for the eight RI/FS wells drilled in 2011.
  - Sampling data packages are still coming in from the last wells drilled. Available data from the drilling activities are currently in review in preparation for writing the RI report.

100-KR-4 Groundwater Operable Unit – Bert Day / Chuck Miller

No substantial changes in groundwater contaminant concentrations were observed during December in 100-K Area monitoring wells.

- CERCLA Process Implementation:
  - Resolution of regulatory review comments on the Draft A RI/FS and Proposed Plan continues at this time. Preliminary comment responses have been submitted.

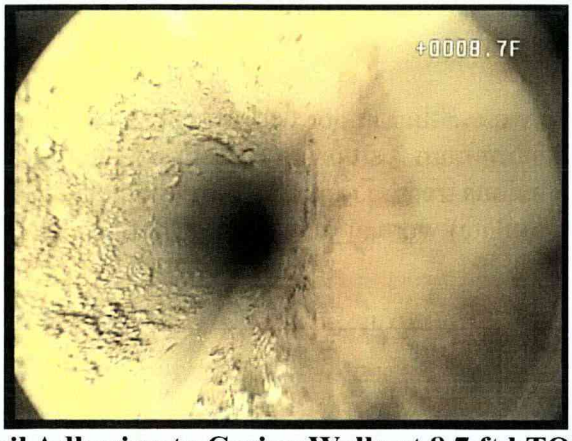
- Remedial Actions:
  - KR-4, KX, and KW pump and treat systems are operating normally. The KW system is now operating with SIR-700 resin modifications.
  - October through December, 2011 performance:
    - The systems treated 97 million gallons.

- The system removed 28.6 kg of hexavalent chromium

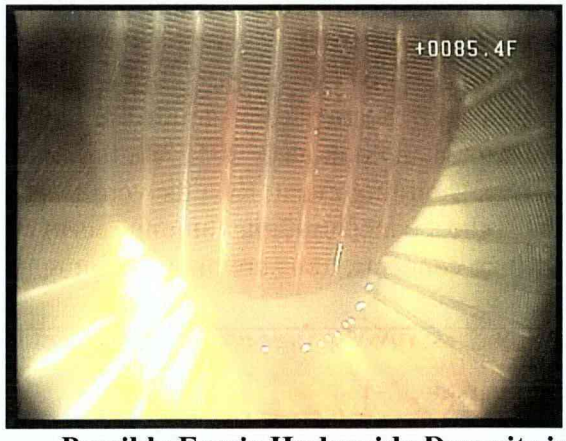
- Modifications & Expansions
  - ResinTech SIR-700:
    - KW P&T continuing to operate on SIR-700 resin. Observations indicate satisfactory function.
    - Preparation of the draft Test Report documenting the use of SIR-700 at KW and KR-4 is ongoing.
  - Well Realignment:
    - Potential realignment of groundwater extraction and injection wells is being evaluated. This includes assessment of Cr(VI) plume conditions in the eastern portion of 100-K Area (e.g., vicinity of well 199-K-182) as well as other plume areas.

- Issues and Conditions Observed
  - Well 199-K-36: A quantity of sand and gravel was found to have bridged within this monitoring well during an effort to re-open the well casing on 12 December 2011. The material was loosened, some was removed using a vacuum and the remainder fell to the bottom of the well, allowing removal of the remaining Hydrostar™ pump components from the well. A camera inspection confirmed that the remaining well casing appears to be undamaged. About eight feet of sand and gravel remain in the bottom of the screened interval and efforts will be made to remove as much of this material as possible and return the well to service. Photos of the well recovery activity and observed conditions inside the well casing are shown below. RL and PRC will schedule a briefing on this well in January 2012.

Well Maintenance Staff Removing the Remaining In-Well Pump Components from Well 199-K-36.



Soil Adhering to Casing Walls at 8.7 ft bTOC.



Possible Ferric Hydroxide Deposits in Screen at 85.4 ft bTOC

  - Cr(VI) in Groundwater in Vicinity of 100-N Area. Hexavalent chromium has been observed in groundwater in the vicinity of 100-N Area for some time.

- . Examples of monitoring wells in the 100-N vicinity that have exhibited hexavalent chromium (measured as either Cr(VI) or as total chromium in filtered samples) include:
  - 199-N-71, which has exhibited variable concentrations from ~2 to ~ 10 ug/L since the 1990s
  - 199-N-74, which has exhibited variable concentrations from ~10 to ~ 30 ug/L since 1990
  - 199-N-52, which has exhibited variable concentrations from ~6 to ~9 ug/L since the 1990s
  - 199-K-151, which has exhibited concentrations ranging from ~5 to ~50 since 2007
  - 199-N-18, which has exhibited variable concentrations ranging from ~2 to ~10 ug/L since the 1990s.

  The concentrations are variable and reported detections are not consistent, but in some instances have exceeded the interim remedial action RAOs. This condition has not been fully described and analysis for Cr(VI) in the vicinity of 100-N has not been consistent over the years, however, the observed Cr(VI) in groundwater likely originated from historical discharges of cooling water at the 116-K-2 Trench. These historic discharges were expected to have produced a widely-dispersed groundwater mound that would have extended inland and down-stream along the river for a considerable distance. Current estimates of groundwater movement suggests that the Cr(VI) in the vicinity of 100-N is probably not presently moving into 100-N, but rather has existed in that area for some time and is part of the widely-dispersed Cr(VI) observed at numerous locations in all directions around 100-K Area.

100-BC-5 Groundwater Operable Unit – Bert Day/ Mary Hartman

(M-015-68-T01, 11/30/2011, Submit CERCLA RI/FS Report and Proposed Plan for the 100-BC-1, 100-BC-2 and 100-BC-5 Operable Units for groundwater and soil.)

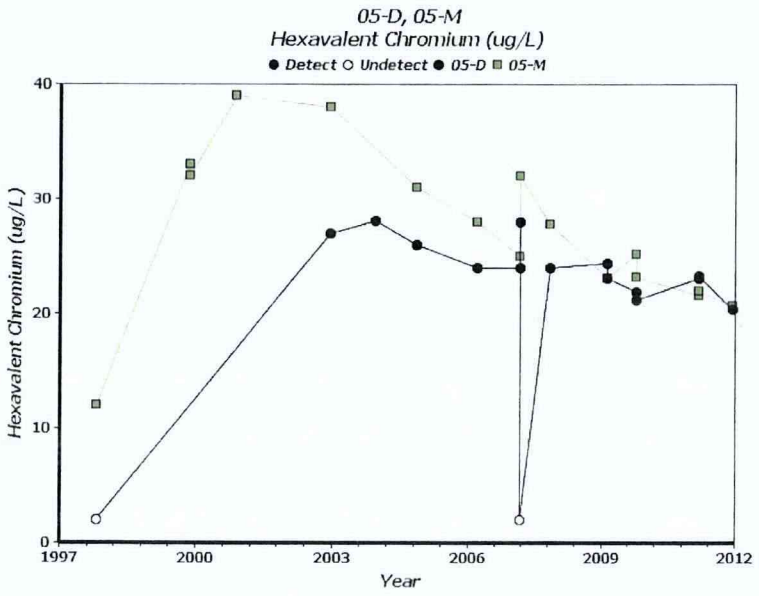
Schedule Status - The new planned delivery date for the 100-BC Draft A RI/FS Report to the regulators is currently being re-evaluated based on 100-K comments. Field investigations are complete.

RI/FS & PP: Activities continue on the document development. Team is currently planning an alternative workshop in late January for both BC and F.

No new groundwater monitoring results to report. The comprehensive annual sampling event is scheduled for January 2012.

Twelve of 26 aquifer tubes were sampled in December. Others were either under water, or frozen. They will be attempted again in early 2012. So far, only hexavalent chromium results have been received from the December sampling event. Results were consistent with previous trends, ranging from undetected to 20 ug/L. The highest concentrations (among recent data received to date) were at tube site 05 (near water intake), where concentrations are on a declining trend.

20 IDW drums were disposed @ ERDF during the first week in January.



300-FF-5 Groundwater Operable Unit – Marty Doornbos/Virginia Rohay

M-015-72-T01 (due December 31, 2011) "Submit CERCLA RI/FS Report and Proposed Plan for the 300-FF-2 and 300-FF-5 Operable Units for groundwater and soil."

- M-015-72-T01 milestone was completed on December 27, 2011.
- RI/FS report (DOE/RL-2011-99) Draft A delivered to DOE-RL on December 21, 2011 and to EPA and Ecology on December 27, 2011.
- Proposed Plan (DOE/RL-2011-47) Draft A delivered to DOE-RL on December 21, 2011 and to EPA and Ecology on December 27, 2011.

The 300-FF-5 Groundwater OU includes the groundwater impacted by releases from waste sites associated with three geographic subregions: 300 Area Industrial Complex, 618-11 Burial Ground, and 618-10 Burial Ground/316-4 Cribs. Principal controlling documents are:

- 300-FF-5 OU operations and maintenance plan (DOE-RL-95-73, Rev. 1, 2002)
- 300-FF-5 OU sampling and analysis plan (DOE/RL-2002-11, Rev. 2, 2008)
- 300 Area RI/FS work plan (DOE/RL-2009-30, Rev. 0, 2010)
- 300 Area RI/FS sampling and analysis plan (DOE/RL-2009-45, Rev. 0, 2010).

300 Area Industrial Complex — The semi-annual comprehensive sampling event scheduled for December has been completed for more than half of the wells; sampling will continue in January. There are no significant changes since the December unit manager meeting report.

618-11 Burial Ground — The tritium concentrations in samples collected in December are consistent with historical trends and expectations.

618-10 Burial Ground/316-4 Cribs — The most recent results for groundwater samples from wells 699-S6-E4K and 699-S6-E4L near the 618-10 Burial Ground do not show any evidence of groundwater contamination resulting from the excavation activities initiated at this site in March 2011 (e.g., as a result of application of water for dust control). However, this conclusion is tentative pending results from additional groundwater monitoring scheduled for December (but not yet completed).

Wells sampled in December 2011

Summary of Wells Sampled in the River Corridor Areas During December 2011						
Week	**100-BC**	**100-K**	**100-N**	**100-D/H**	**100-F**	**300 Area**
1-4 Dec 11		699-72-33		699-97-43B 699-97-48B	699-58-24 699-66-23	399-3-18
5-11 Dec 11					199-F8-4 199-F5-1 199-F5-47 199-F5-44 199-F5-55 199-F5-6 199-F5-46 199-F7-1 699-13-1E 699-13-2D 699-13-3A	399-1-10A 399-1-10B 399-1-16B 399-1-16A 399-1-18A 388-1-17A 399-1-17B 399-1-18B
12-18 Dec 11			199-N-52 199-N-173	699-98-49A 699-93-48A 699-95-45 699-94-43 699-94-41 699-95-51 199-H1-33 199-H1-35 199-H1-40 199-H1-37 199-H1-32 699-95-48 199-D4-62 199-H4-12C 199-H3-4 699-97-48C 699-96-52B 199-D4-48 199-H5-1A 199-H4-16 199-H4-10 199-H4-5 199-H4-45 199-H4-13 199-H6-1 199-H4-48 199-H3-2A 199-H3-3 199-D2-6 199-D5-33 199-D5-18 199-D5-16 199-D5-15 199-D5-13 199-H3-5 199-D8-71 199-D5-106 199-D8-70 199-D4-31	699-88-47 199-F5-54	

Summary of Wells Sampled in the River Corridor Areas During December 2011						
Week	**100-BC**	**100-K**	**100-N**	**100-D/H**	**100-F**	**300 Area**
				199-D4-22 199-D4-36 199-D5-34 199-D4-4 199-D2-11 199-D4-38 199-D3-2		
19-25 Dec 11		199-K-22 199-K-149 199-K-150 199-K-185 199-K-196 199-K-119A 199-K-197		699-101-45 699-97-45 699-98-43 699-97-51A 699-100-43B 699-99-41 699-99-44		399-3-33 399-3-6 399-3-9 399-3-12 399-3-20 399-4-14 399-4-12 399-4-10 399-4-9 399-4-15 399-4-7 399-8-1 399-8-3 399-5-4B 399-8-5A 399-1-1 399-1-2 399-1-6 399-1-7 399-2-1
25-31 Dec 11				699-97-43C 699-97-45B 699-98-46 699-98-51 199-H1-42 199-H1-27 199-H1-25 199-H1-1 199-H1-43 199-H1-38 199-H1-36 199-H1-34 199-H3-2C 199-H4-64 199-H4-63 199-H4-4 199-H4-75 199-H4-70 199-H4-69 199-H4-15A 199-H1-45 199-H4-76 199-H4-77		399-1-11 399-1-15 399-1-23 399-1-54 399-1-55 399-1-56 399-1-57 399-1-58 399-1-8 399-3-18

100/300 Areas Unit Managers Meeting
January 12, 2012

December Aquifer Tubes

AT-3-7-S		C6231		DD-49-4	
AT-3-7-D		C6232		DD-49-3	
AT-3-8-S		C6235		DD-49-2	
AT-3-8-M		C6234		DD-44-3	
AT-3-7-M	Unsuccessful	C6233		DD-44-4	
67-M		Redox-3-4.6	Unsuccessful	DD-43-2	
67-S		Redox-4-3.0		DD-43-3	
66-D		Redox-4-6.0		DD-42-2	
66-M		DD-39-1		DD-42-3	
68-S		DD-39-2		DD-42-4	
68-M		Redox-2-6.0		DD-41-1	
68-S		Redox-1-3.3		DD-41-2	
68-D		Redox-1-6.0		DD-41-3	
62-M		AT-D-1-S		C6275	
74-D		Redox-3-3.3	Unsuccessful	DD-16-4	
75-D		38-D		DD-16-3	
76-D		38-M		C6282	
77-D		C6272		C6281	
01-M		AT-D-1-D		DD-06-2	
AT-B-1-M		AT-D-1-M		DD-06-3	
04-D		AT-D-3-S		AT-D-5-M	
C6229	Unsuccessful	AT-D-3-M		AT-D-5-D	
C6228	Unsuccessful	AT-D-3-D		C6282	
C6227	Unsuccessful	AT-D-2-S		C6281	
03-D	Unsuccessful	AT-D-2-M		DD-06-2	
AT-B-2-D	Unsuccessful	AT-D-4-S		DD-06-3	
05-M		AT-D-4-M		AT-D-5-M	
05-S	Unsuccessful	AT-D-4-D		AT-D-5-D	
C7724		C6266		C7648	
C7725	Unsuccessful	C6267		C7645	
C7726		C6268		C7646	
06-S		C6271		C7647	
06-M	Unsuccessful	C6269		C6278	
06-D	Unsuccessful	C6270		DD-12-2	Unsuccessful
C7780		36-D		DD-12-4	
C7781	Unsuccessful	36-M		DD-15-2	
C7782		36-S		DD-15-3	
05-D	Unsuccessful	DD-50-2		DD-15-4	
C7719	Unsuccessful	DD-50-1		DD-17-2	

C7720	Unsuccessful	DD-50-3		DD-17-3	
C7718		DD-50-4		47-D	Unsuccessful
12-D		DD-49-1		47-M	
AT-H-2-D		AT-H-3-D		48-M	
AT-H-2-M		AT-H-3-S		48-S	
AT-H-2-S		C7649		49-D	
AT-H-1-D		C7650		C6296	
AT-H-1-M				C6297	
AT-H-1-S				C6299	
C6293				C6300	
45-S				C6301	
45-M					
45-D					

Attachment 3

January 12, 2012 Unit Manager's Meeting
Field Remediation Status

100-B/C

- Completed remediation at 100-C-7
- 100-C-7, 352,000 bank cubic meters removed, excavation depth 85 feet
- Continued remediation efforts at 100-C-7:1
- 100-C-7:1, 545,000 bank cubic meters removed, excavation depth 70 feet

- Continued load-out activities
- Truck and pup, 172,000 tons
- ERDF cans, 77,000 tons
- LDR material, 41,000 tons

- MSA continued engineering design for relocation of high voltage transmission line. Excavation permit complete

100-D

- Continued demolition, processing and load-out at 100-D-50:7 (stage 2)
- Completed excavation of 100-D-77 (tier 2)
- Continued equipment set-up and validation for NaK treatment at 118-D-3:2
- Continued sampling at 100-D-77 (tier 2)

100-F

- Completed excavation adjacent to the southern concrete tunnel wall at 100-F-57 to groundwater
- Continued final closeout activities for remaining waste sites
- Began backfill
- Continued gravel removal from the CTA
- Continued truck and pup load out from 100-F-57 stockpiles
- Radcon trailer (MO 1140) demobilized

100-H

- No activities being conducted at 100-H at this time

100-K

- Continued final cleanup activities at trenches I and N (downposting/surveying/sampling/spot removal)
- Continued orphan site cleanup work (600-029, 128-K-1)
- Began equipment decontamination activities

100-N

- Continued excavation and load-out at UPR-100-N-13, UPR-100-N-26, 100-N-23, 100-N-60, 100-N-63, 120-N-3 and the Golf Ball Area and collocated waste sites (UPR-100-N-4, UPR-100-N-5, UPR-100-N-8, UPR-100-N-25, UPR-100-N-31 and 116-N-2)
- Initiated verification sampling at 100-N-33 and 100-N-47
- Technical meeting with Ecology held on 1/9/11 on in-situ bioremediation 90% design

618-10 Trench Remediation

- IH and Respiratory Program issues continue to be worked
- Working noise exposure issues. Performing baseline noise monitoring
- Performed mock-ups, procedure walkthroughs, and readiness for "in trench" bottle processing
- Working on readiness activities for Load-out activities, including container loading/unloading training

100-IU-2/6

Milestone Sites

- Completed all site revegetation
- Completed TPA milestone

Non-Milestone Sites

- As resources available remediate the two IU suites available.
- Waiting for completion of cultural review prior to remediation at the IU farmstead sites.
- Waiting for completion of cultural review prior to remediation at the IU White bluffs sites.

Attachment 4

162977

^WCH Document Control

From: Saueressig, Daniel G
Sent: Tuesday, December 20, 2011 12:13 PM
To: ^WCH Document Control
Subject: FW: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D
Please provide a chron number. This email documents a regulatory approval.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Kapell, Arthur (ECY) [mailto:akap461@ECY.WA.GOV]
Sent: Tuesday, December 20, 2011 10:39 AM
To: Saueressig, Daniel G
Cc: Post, Thomas C; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P; Boyd, Alicia; Menard, Nina
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Dan,

Ecology appreciates your efforts to identify those waste staging piles that have been operating without having received prior approval. We acknowledge receiving notification of two staging piles associated with the 100-D-100 and 116-H-5 sites which began operation prior to receiving approval.

You have indicated that "compensatory actions" have been taken at WCH to ensure that in the future staging piles receive approval before operating. These actions are:

> Management has issued a standing order requiring the manager of environmental compliance/services approve any waste staging area before it gets used. In addition, the project startup checklist used by the field engineers is being updated to ensure they have regulator approval prior to setting up a staging area in addition to noting and planning for the expiration date. In addition, Julian and I (Dan Saueressig) will be meeting monthly to status our active staging areas and ensure the project is able to close them in a timely manner.

The steps outlined here will hopefully serve to circumvent any future need to approve a staging area subsequent to beginning its operation. Note that the operation and termination of these staging piles must be done in accordance with section 4.5.2 of the 100 Area RDR/RAWP (DOE/RL-96-17, Rev. 6). This includes the provision that the staging piles must not operate for more than two years as measured from the first time remediation waste was placed into the piles. Within 180 days after the operating term of the staging pile located in a previously uncontaminated area expires, the staging pile must be closed in accordance with substantive provisions of 40 CFR 264.258(a) and 40 CFR 264.111, or 40 CFR 265.258(a) and 40 CFR 265.111. This includes removing all remediation waste, contaminated

containment system components, contaminated structures and equipment, and leachate.

Your notification concerning the staging piles at the two sites include:

Staging Pile at 100-D-100
Prior to beginning operation on August 16, 2011 the area of the staging pile was surveyed and the perimeter bermed. Additionally, there are no waste sites in this area and the area does not coincide with any orchard lands.

Staging Pile at 116-H-5
A staging/stockpiling area was identified on initial drawings briefed to Ecology on August 24, 2006. Additional staging was requested in an email to Ecology on November 17, 2008, although it is uncertain as to whether this request was approved. The staging piles received a total of four rock trucks of material, on December 1 and 2, 2008. The last of the waste material was loaded out on July 20, 2009. Closure documents for the 116-H-5 waste site, which includes the staging pile, are currently under review.

Ecology approves the use of the indicated staging areas for the 100-D-100 and 116-H-5 sites. Ecology also acknowledges receiving information that the staging piles at 116-H-5 are no longer in use, all waste has been removed, and that information closing the staging pile areas has been included in the RSVP for 116-H-5 waste site that Ecology is currently reviewing.

Please enter this approval into the minutes at the next UMM.

Artie Kapell
Nuclear Waste Program
Washington State Department of Ecology
(509) 372-7972
(509) 372-7971 Fax

From: Saueressig, Daniel G [mailto:dgsauere@wch-rcc.com]
Sent: Thursday, December 15, 2011 6:41 AM
To: Kapell, Arthur (ECY)
Cc: Post, Thomas C; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P; Boyd, Alicia (ECY)
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Artie, per our discussion yesterday, you asked for the reference related to ensuring we keep workers exposure ALARA. 10 CFR 835, Section 1001 discusses the need to keep workers exposure as low as reasonably achievable.

Also at the meeting yesterday, I committed to providing you some information on compensatory actions we're taking to ensure that we don't exceed a time limit for a waste staging area in the future. Management has issued a standing order requiring the manager of environmental compliance/services approve any waste staging area before it gets used. In addition, the project startup checklist used by the field engineers is being updated to ensure they have regulator approval prior to setting up a staging area in addition to noting and planning for the expiration date. In addition, Julian and I will be meeting monthly to status our active staging areas and ensure the project is able to close them in a timely manner.

Finally, the characterization data for the anomalies that were staged in the 118-D-3:2 anomaly area has been

placed on the FTP drive for you and Noel to review in regards to the COPC's list we are proposing as part of the verification work instructions for closing this area.

Thanks and give me a call if you have any question.

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Tuesday, December 13, 2011 6:44 AM
To: 'Kapell, Arthur (ECY)'; Boyd, Alicia
Cc: Post, Thomas C; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P; Zacharias, Ames E
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Artie/Alicia, the 2 NaK specimens are currently being stored in a shielded bunker in a High Radiation Area/High Contamination Area due to the extremely high radiological dose associated with this material. This makes conducting weekly inspections difficult as our radiological control organization mandates keeping exposure to workers As Low As Reasonably Achievable (ALARA).

Since we don't want our workers receiving unnecessary exposures, we plan to install a camera and light into the bunker during this weeks inspection so that future inspections can be done remotely. In addition, since worker safety and ALARA concerns make getting up close to these containers a safety issue, we labeled the bunker with dangerous waste and major risks labels, instead of the individual containers.

Let me know if you have any concerns with this approach.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Thursday, December 01, 2011 9:15 AM
To: 'Buelow.Laura@epamail.epa.gov'; 'Kapell, Arthur (ECY)'; Boyd, Alicia
Cc: Post, Thomas C; Neath, John P; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P
Subject: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Laura/Artie/Alicia, I met with EPA and DOE last Wednesday regarding the anomaly staging area at 100-D and Dennis Faulk suggested we put together a schedule for when we believe we can process and remove the remaining waste from this area.

Attached is a schedule and short summary detailing when we believe we can disposition and dispose of the remaining material at the anomaly staging area at 100-D. The schedule is based on getting approval to treat the

NaK test specimens by today. Discussion with Robin Varljen at Ecology indicates that they will be in a position to approve the NaK treatment plan today.

Let me know if you have any questions or concerns. If you are okay with this schedule and summary, I'd like to document the path forward at the next UMM.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

<< File: Staging Pile Summary_12_1_11.doc >> << File: POW - SSNF Summary.pdf >>

Attachment 5

^WCH Document Control 163033

From: Saueressig, Daniel G
Sent: Thursday, December 29, 2011 8:37 AM
To: ^WCH Document Control
Subject: FW: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Please provide a chron number. This email documents a regulatory agreement.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Post, Thomas C [mailto:thomas.post@RL.gov]
Sent: Thursday, December 29, 2011 8:36 AM
To: Saueressig, Daniel G
Cc: Landon, Roger J; Wilkinson, Stephen G
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Dan,

I concur for DOE.

Thank you.

Tom Post

From: Saueressig, Daniel G [mailto:dgsauere@wch-rcc.com]
Sent: Thursday, December 29, 2011 6:24 AM
To: Post, Thomas C
Cc: Landon, Roger J; Wilkinson, Stephen G
Subject: FW: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Tom, do you concur that performing weekly inspections remotely with a camera is acceptable? So far we have been opening the lid and inspecting the containers weekly, as we're trying to get everything ready for remote inspections. Let me know if you concur.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Kapell, Arthur (ECY) [mailto:akap461@ECY.WA.GOV]
Sent: Tuesday, December 20, 2011 8:46 AM
To: Saueressig, Daniel G
Cc: Boyd, Alicia
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Dan,

Should it be logistically possible to perform the necessary weekly inspections of the 2 NaK specimens stored in the shielded bunker by using a camera and light, I concur that this approach would meet the goal of keeping exposure to your workers as low as reasonably achievable. Please also seek the concurrence of the Department of Energy in this matter.

Artie Kapell
Nuclear Waste Program
Washington State Department of Ecology
(509) 372-7972
(509) 372-7971 Fax

From: Saueressig, Daniel G [mailto:dgsauere@wch-rcc.com]
Sent: Tuesday, December 13, 2011 6:44 AM
To: Kapell, Arthur (ECY); Boyd, Alicia (ECY)
Cc: Post, Thomas C; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P; Zacharias, Ames E
Subject: RE: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

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Since we don't want our workers receiving unnecessary exposures, we plan to install a camera and light into the bunker during this weeks inspection so that future inspections can be done remotely. In addition, since worker safety and ALARA concerns make getting up close to these containers a safety issue, we labeled the bunker with dangerous waste and major risks labels, instead of the individual containers.

Let me know if you have any concerns with this approach.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Thursday, December 01, 2011 9:15 AM
To: 'Buelow.Laura@epamail.epa.gov'; 'Kapell, Arthur (ECY)'; Boyd, Alicia
Cc: Post, Thomas C; Neath, John P; Wilkinson, Stephen G; Landon, Roger J; Curcio, Joseph P
Subject: SCHEDULE FOR DISPOSITION ON ANOMALOUS WASTE AT 100-D

Laura/Artie/Alicia, I met with EPA and DOE last Wednesday regarding the anomaly staging area at 100-D and Dennis Faulk suggested we put together a schedule for when we believe we can process and remove the remaining waste from this area.

Attached is a schedule and short summary detailing when we believe we can disposition and dispose of the remaining material at the anomaly staging area at 100-D. The schedule is based on getting approval to treat the NaK test specimens by today. Discussion with Robin Varljen at Ecology indicates that they will be in a position to approve the NaK treatment plan today.

Let me know if you have any questions or concerns. If you are okay with this schedule and summary, I'd like to document the path forward at the next UMM.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

<< File: Staging Pile Summary_12_1_11.doc >> << File: POW - SSNF Summary.pdf >>

Attachment 6

162852

^WCH Document Control

From: Saueressig, Daniel G
Sent: Monday, December 12, 2011 6:45 AM
To: ^WCH Document Control
Subject: SUPERSEDES CCN 162836; NAK APPROVAL (DOCUMENTS A REGULATORY AGREEMENT)

Attachments: NAK TREATMENT APPROVAL.PDF

Please chron the attached approval. I believe this should supersede the previous email.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

NAK TREATMENT APPROVAL.PDF (1 ..

From: ^WCH Document Control
Sent: Wednesday, December 07, 2011 1:04 PM
To: Saueressig, Daniel G
Subject: CCN 162836; NAK APPROVAL (DOCUMENTS A REGULATORY AGREEMENT)

Web-Viewable Link:
http://DMP01.wch-rcc.com/ucm/groups/ias/@docctl/@general/documents/em/1963316.pdf

TREATMENT PLAN FOR 100-D BURIAL GROUNDS NaK

1.0 INTRODUCTION

During remediation of the 100-D/100-DR burial grounds, numerous pieces of suspect spent nuclear fuel (SSNF) were identified and segregated. These items were segregated from the other waste streams until they could be fully characterized to determine if they were indeed spent nuclear fuel (SNF). The process of characterizing these items included collecting gamma spectrum information (In Situ Object Counting System) for each, determining mass, collecting dimensional information, performing detailed videography for visual inspections, and recording any unique identifiers (e.g., serial numbers). This collection of data was then compared to known SNF reference material, including comparison of serial numbers when available, to confirm if the suspect item was actually SNF. Once this evaluation was completed, confirmed SNF was segregated from test specimens that were determined not to be SNF for shipment to the SNF storage facility at 105-KW.

2.0 BACKGROUND

During the course of this characterization process, two discrete test specimens were identified. The unique identifiers assigned to each of these specimens by Washington Closure Hanford (WCH) are 118D3-SSNF-018 and 118D3-SSNF-026. These test specimens were part of a series of experiments during 100-DR Reactor operations to help determine the failure mechanism of zircaloy-2 clad fuel elements. Survey results identified low levels of removable contamination on the exterior surfaces of the test specimens. The design of the test specimens consists of uranium capsule(s) (1.47% enriched by weight in 018 and 1.60% enriched by weight for 026) centered in a tube with a small annular space around the capsules and an "expansion chamber" at one end. The annular space was filled with a eutectic alloy of sodium and potassium commonly referred to as NaK. The purpose of the expansion chamber was to allow the NaK to expand when heated without pressurizing the test assembly to the point of failure. To ensure the inner uranium capsules were evenly heated, NaK was used as heat transfer material in these test specimens.

Both test specimens, 018 and 026 (Figures 1 and 2, respectively), are similar in design but with unique characteristics. The design differences were to capture different variables for the same objective, the determination of cladding failure mechanisms. Each specimen is expected to contain between 10 and 16 cc of NaK, based on historical documentation (see HW-67264 and HW-63513 for additional specifications on the design for each specimen).

NaK, because it is a eutectic alloy, remains liquid at room temperature. It is a pyrophoric material that is highly water reactive and can form potassium oxides (K2O) or super oxides, (KO)2, when contacted by air. The super oxides can become shock sensitive when combined with organics.

Offsite treatment for these two test specimens was investigated but not available due to the combination of radioactive material and reactive material, NaK.

3.0 TREATMENT PROCESS

The processing area will be set up to minimize the spread of contamination and the release of airborne radioactivity from the work area. The work will be performed within a high-efficiency particulate air- (HEPA-) ventilated enclosure that is operated under negative pressure. The ventilated enclosure is being used in conjunction with separate containments set up within the enclosure where the NaK deactivation and test specimen disassembly work will be performed. During this NaK treatment and disassembly process, secondary containment will be provided for items containing liquid waste to prevent a spill of potentially contaminated material to the environment.

The NaK deactivation process takes place in the containment vessel that has a vacuum system, which, by design, will provide negative air flow inside the vessel when it is opened to remove the test specimens after drilling.

The test specimen disassembly is conducted in a NaK disassembly system (NDS) within a containment that is designed to create an inert atmosphere for the test specimens during the disassembly process. Nitrogen is introduced to inert the NDS containment atmosphere, and the containment is ventilated through a HEPA-filtered exhauster located inside the HEPA-ventilated enclosure.

Only one test specimen will be processed at a time, and on different days.

3.1 NaK DEACTIVATION

Each of the two specimens will be subjected to a NaK deactivation process in a type of containment vessel known as the Valkyr Mark III (Figure 3). The Mark III vessel is a schedule 40 carbon-steel 6-in. pipe that is 24 in. long with a class 150 door closure mechanism built to American Society of Mechanical Engineers (ASME) standards. The Mark III door closure is rated for 320 psig at 250 °F. The Mark III design has been used for years to process small (lecture bottle) compressed gas cylinders. The specimen is inserted inside the Mark III and the door sealed.

The basic process is to remotely drill a hole through the expansion chamber (from top through bottom) after inerting the atmosphere inside the Mark III with nitrogen, then inject steam into the Mark III to convert the NaK into sodium/potassium hydroxide, thus eliminating the reactive nature of the NaK. By drilling the hole completely through the test specimen on the opposite end from the zircaloy-clad uranium pieces, it eliminates the possibility of condensed steam pooling in the expansion chamber. The process is as follows:

1. Air is purged from the Mark III interior and replaced with an inert gas, the Mark III is heated to approximately 250 °F to minimize steam condensation, and the drill activated. For this

project, the drilling will be done remotely. The progress of the drill will be viewed by an infrared camera and a remotely positioned monitor.

2. Once the test specimen has been penetrated steam is injected into the Mark III. Use of steam has been demonstrated by the alkali metal industry to be one of the safest and most thorough methods of NaK deactivation. A valve on the steam generator is opened and steam allowed to flow into the Mark III and, subsequently, into the specimen through the drilled hole. A series of vessel evacuations followed by steam injections are conducted to complete the NaK deactivation process. Note that both vessel temperature and pressure will be remotely monitored. NaK reacts quickly and completely with steam to form both sodium and potassium hydroxide. The immediate evolution of hydrogen is anticipated. The temperature and pressure are controlled through remote valve operation. The pressure will not be allowed to exceed 25 psig, and the maximum temperature allowed is 250 °F.

3. A condensate collection vessel between the venturi scrubber and the Mark III will be used to capture condensed steam and reacted material from the Mark III. A venturi scrubber will be used to evacuate the Mark III to sub-atmospheric pressure for the purpose of removing both steam and hydrogen from the Mark III. A venturi scrubber is a liquid-phase scrubber that recirculates reagent, in this case water, through a venturi, thus inducing a vacuum. This vacuum provides the motive force to move the steam and hydrogen through the condensate collection vessel, which is sparged through a dip tube submerged in water. The water in both the condensate collection vessel and the venturi scrubber serves two purposes, to help cool the steam that is evacuated and to trap or entrain any particles that may be carried by the condensate or steam. The hydrogen and nitrogen are then released to the atmosphere inside the ventilated enclosure. There are no emissions of reacted material, sodium, or potassium hydroxide because they are captured in either the condensate collection vessel or the venturi. The temperature of the air leaving the venturi will be monitored to ensure any material coming from the venturi will not impact the ducting or HEPA filtered exhausters.

4. After the Mark III's initial purge with steam and subsequent evacuation, the vessel will again be isolated and steam injected. Pressure will be allowed to build in an effort to force steam into the area between the capsules and the container wall. Operators will monitor vessel pressure and open the vessel outlet valve to allow the scrubber to remove the contained atmosphere. It is anticipated that this process will be repeated at least three times or more as required until no further pressure buildup is observed on system pressure sensors. The lack of pressure increase after processing, as described above, is a clear indication no unreacted NaK remains.

3.2 TEST SPECIMEN DISASSEMBLY

After the NaK deactivation process is complete, the test specimen will be transferred from the Mark III to the NDS. The NDS consists of a remotely operated lathe designed to make multiple circumferential cuts along the outer shell of the NaK test specimen to support separation of the uranium capsule from the test specimen outer casing. Each cut is restricted to a specific cutting depth to maintain the integrity of the uranium capsule. Upon completion of circumferential cutting, the test specimen outer casing is removed. During the cutting and separation process, the test specimen will be sprayed with an atomized water mist to neutralize any remaining NaK, if present.

The remotely operated lathe operations will take place inside a polycarbonate containment structure that is 72 in. long by 36 in. wide by 32 in. high and inerted with nitrogen. Exhaust from the NDS containment is recirculated through a HEPA-filtered exhauster located inside the HEPA-ventilated enclosure. Nitrogen will also be used as a cooling/purge gas for the lathe cutting blade. Progress of the cutting process will be viewed by a camera and remotely positioned monitor.

Continuous monitoring of oxygen levels within the NDS containment will be conducted. A digital display indicating current oxygen levels will be observed by the control operator using a closed circuit monitor. Oxygen levels during operations will be maintained below 10%.

4.0 TREATMENT OBJECTIVES

The NaK is treated to meet the treatment standards for D001, Ignitable Characteristic Wastes, and D003, Water Reactive Subcategory. It will be treated to meet the land disposal restriction (LDR) standard of deactivation to remove the hazardous characteristic (DEACT) and meet 40 *Code of Federal Regulations* (CFR) 268.48 standards. As the NaK consists solely of potassium and sodium, there are no underlying hazardous constituents (UHCs) to address. There will be no sampling and analysis to confirm these treatment standards have been met as the treatment standards are simply deactivation of the hazard. This treatment process, as described above, will produce a very dilute aqueous stream including small amounts of sodium-hydroxide and potassium-hydroxide.

After treatment is complete for both specimens, the liquid waste will be sampled and analyzed per the *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan* (DOE/RL-2001-35) to quantify radiological components, measure the pH (estimated to be <12.5), and determine the concentration of metals. The results of the analysis will dictate the disposal path of wastes generated.

A small amount of hydrogen gas will be vented to the atmosphere inside the ventilated enclosure during the treatment process (<0.25 moles for each test specimen containing NaK). If the pH of the aqueous stream generated is D002 (≤2 or ≥12.5), it will need to meet the treatment standard of DEACT and meet 40 CFR 268.48. Again, there are no UHCs. Treatment of the aqueous stream may be done by the generator, in which case DEACT will be accomplished through elementary neutralization using nitric acid, sulfuric acid, or hydrochloric acid. Once the pH is <12.5, the waste will be stabilized in concrete or absorbed using a nonbiodegradable polyacrylate absorbent. Alternatively, the aqueous stream may be sent to Permafix for treatment through a lead regulatory agency-approved *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* offsite determination in accordance with the *Remedial Design Report/Removal Action Work Plan for the 100 Area* (DOE/RL-96-17).

If the aqueous stream contains metals above regulated levels (WAC 173-303-090 or 40 CFR 268.48), it will be treated via stabilization in concrete or sent to Permafix for treatment.

Secondary wastes, which likely will include processing components from the Mark III and downstream, will be managed based on sampling results of the liquid. Scaling factors may be used to more accurately reflect field radiological survey results and/or potential residues remaining.

5.0 WASTE DISPOSAL

The uranium capsules will be sent to the Central Waste Complex in the 200 West Area of the Hanford Site for storage and ultimately to the Waste Isolation Pilot Plant for disposal.
The treated secondary waste will be shipped to the Environmental Restoration Disposal Facility (ERDF) for disposal. This material will be loaded into an ERDF container in accordance with procedures for the normal loadout of waste from the burial grounds. The treated waste form will meet all requirements of the ERDF waste acceptance criteria (WCH-191).

6.0 BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY

A discussion of the best available radionuclide control technology for the NaK treatment project is included in Appendix A.

7.0 AIR MONITORING

Monitoring activities consist of operating four near-facility monitoring stations upwind and downwind of the 100-D/DR Area, as described in the "Air Monitoring Plan for the 100-D/DR Area Remaining Site and Burial Grounds Remedial Action" (WCH 2010).

A low-volume air sampler will be located within the ventilated enclosure and at the outlet of the ventilated enclosure. Boundary low-volume air samplers will also be located downwind from the ventilated enclosure. Air sampling will be performed when work activities are being conducted within the ventilated enclosure. The air samples will be field counted for gross alpha and gross beta/gamma. If air sample results exceed 0.1 TDAC (based on strontium-90, 7E-09 µC/mL and thorium-232, 3E-12 µCi/mL), then the samples will be sent to the Radiological Counting Facility for gamma energy analysis, alpha energy analysis, and gross alpha and gross beta/gamma analysis.

In addition, as described in the air monitoring plan, potential release locations on the ventilated enclosure, such as the ductwork and seams, will be surveyed on a routine basis for potential radionuclide releases and the results recorded (e.g., post-survey results negative). Any positive survey results will require appropriate maintenance on the equipment prior to further processing of the test specimens as described in this plan. In addition, work progress contamination surveys and dose rate monitoring will be performed within the ventilated enclosure to ensure that contamination levels are within the radiological control requirements.

8.0 REFERENCES

40 CFR 268, "Universal Treatment Standards," *Code of Federal Regulations*, as amended.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE/RL-96-17, 2009, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, Rev. 6, U.S. Department of Energy, Richland, Operations Office, Richland, Washington.

DOE/RL-2001-35, 2001, *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan*, Rev. 0, U.S. Department of Energy, Richland, Operations Office, Richland, Washington.

HW-63513, 1960, *Final Report: Temperature Measurement of Uranium Swelling Capsule PT-IP-200-A*, General Electric, Hanford Atomic Products Operation, Richland, Washington.

HW-67264, 1960, *Proposal for the irradiation of Cladding Studies Capsules*, General Electric, Hanford Atomic Products Operation, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code,* as amended.

WCH, 2010, "Air Monitoring Plan for the 100-D/DR Area Remaining Sites and Burial Grounds Remedial Action," CCN 157902, Washington Closure Hanford, Richland, Washington

WCH-191, 2010, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Rev. 2, Washington Closure Hanford, Richland, Washington

Figure 1. Typical Design for Test Specimen 118D3-SSNF-018.

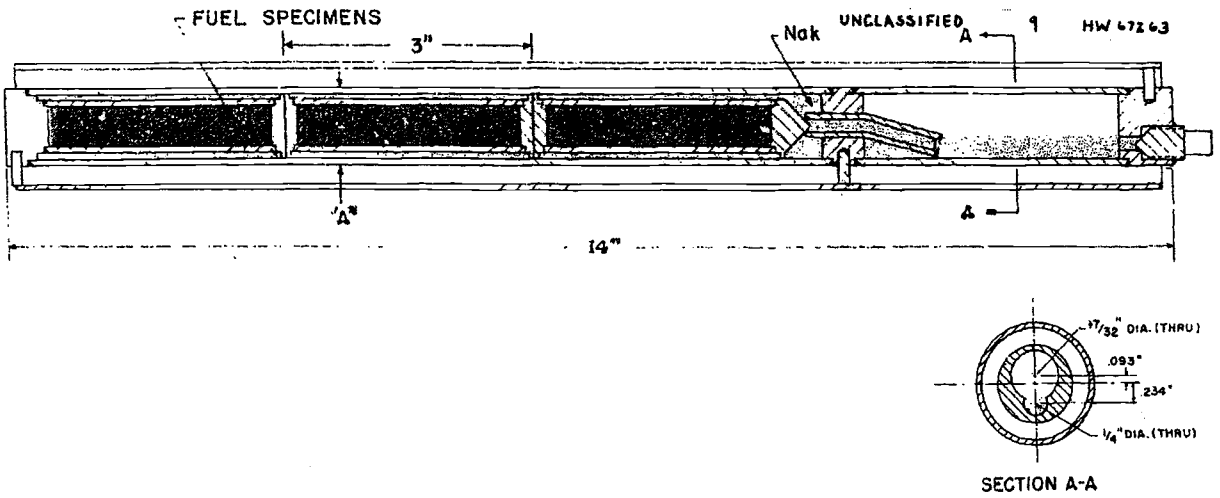


Figure 2. Typical Design for Test Specimen 118D3-SSNF-026.

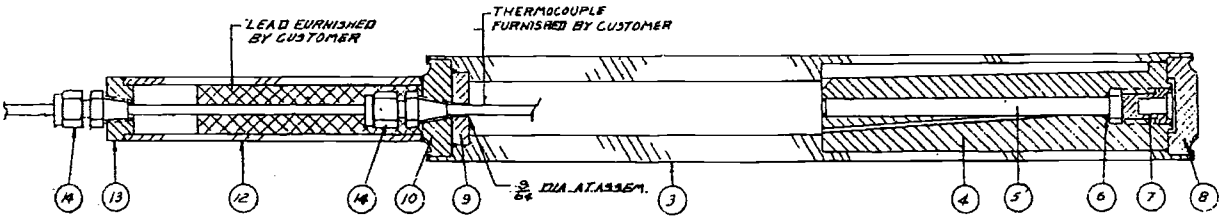
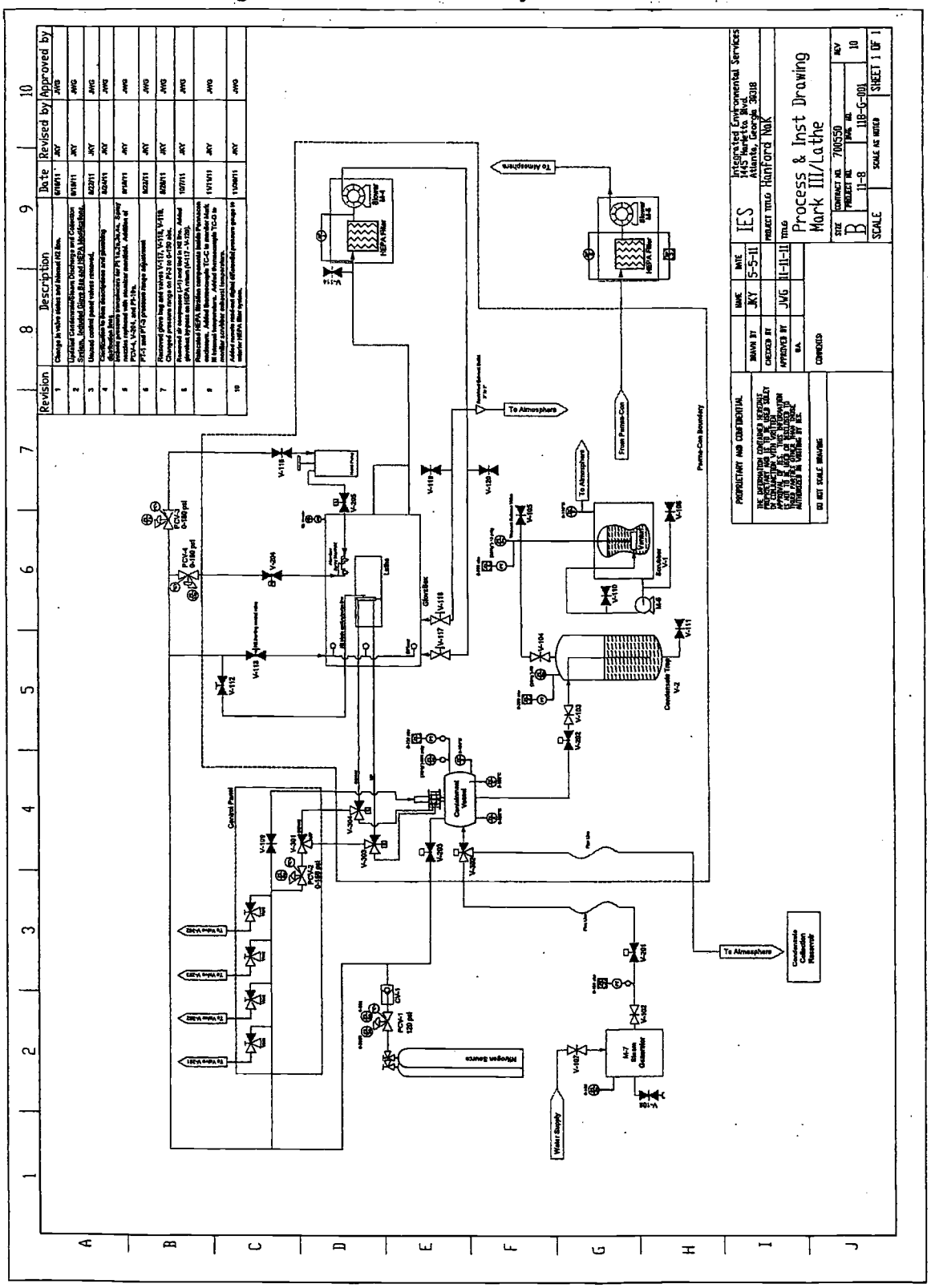


Figure 3. NaK Treatment System Schematic.



APPROVALS

Nina Menard, Project Manager, Washington State Department of Ecology — Date: 12/8/11

Mark French, DOE Federal Project Director — Date: 12/8/11

APPENDIX A

BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY

1.0 SUMMARY OF BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY DEMONSTRATION

A best available radionuclide control technology (BARCT) demonstration is used to choose control technologies for the mitigation of emissions of radioactive material from new emission units or significant modifications to emission units. The bases for the BARCT demonstration requirements are the BARCT standard given in *Washington Administrative Code* (WAC) 246-247-040, and the definition of BARCT given in WAC 246-247-030. This procedure incorporates certain implementing criteria that enable the department to evaluate a facility's compliance with the BARCT standard (WAC 246-247-120).

The BARCT demonstration includes the abatement technology and indication devices that demonstrate the effectiveness of the abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment. The applicant shall evaluate all available control technologies that can reduce the level of radionuclide emissions (WAC 246-247-120).

Technology Standards. The BARCT demonstration and the emission unit design and construction must meet, as applicable, the technology standards listed below if the unit's potential-to-emit (PTE) exceeds 0.1 mrem/yr total effective dose equivalent (TEDE) to the maximally exposed individual (MEI). If the PTE is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation (WAC 246-247-120).

- ASME/ANSI AG-1, *Code on Nuclear Air and Gas Treatment* (where there are conflicts in standards with the other listed references, this standard shall take precedence)
- ASME/ANSI N509, *Nuclear Power Plant Air-Cleaning Units and Components*
- ASME/ANSI N510, *Testing of Nuclear Air Treatment Systems*
- ANSI/ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*
- 40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17
- ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities.*

The following standards and references are recommended as guidance only:

- ANSI/ASME NQA-2, *Quality Assurance Requirements for Nuclear Facilities*
- ANSI N42.18, *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*
- ERDA 76-21, *Nuclear Air Cleaning Handbook*
- ACGIH 1988, *Industrial Ventilation, A Manual of Recommended Practice*, 20th ed., American Conference of Governmental Industrial Hygienists.

Part of the BARCT demonstration process includes defining facility physical and chemical processes. Included are the potential radionuclide release rates (by isotope, in units of curies per year), process variables (such as flow rate, temperature, humidity, chemical composition), and other technical considerations. The radionuclide release rates are based on the PTE (WAC 246-247-120).

2.0 RADIONUCLIDE PHYSICAL/CHEMICAL FORM, RELEASE RATES, FORM, AND POTENTIAL-TO-EMIT

Radionuclides selected for consideration in the BARCT demonstration shall include those that contribute more than 10% of the potential TEDE to the MEI or more than 0.1 mrem/yr and any others that the department determines are necessary (WAC 246-247-120).

The radionuclide release rates in curies per year and the PTE for an offsite MEI for the NaK treatment process are documented in Calculation No. 0100D-CA-V0427, *Total Effective Dose Equivalent for the Treatment of NaK-Filled Specimens in the 100-D Area*, and shown in Table A-1. The radionuclide release rates in curies per year and the PTE, for a potential river receptor for the NaK treatment process, are documented in Calculation No. 0100D-CA-V0431, *Total Effective Dose Equivalent for the Treatment of NaK-Filled Specimens in the 100-D Area (River)*, and shown in Table A-2. As documented in these calculations five radionuclides (Pu-238, Pu-239, Pu-240, Pu-241, and Am-241) are anticipated to account for more than 99% of the dose drivers based on N Reactor Mark IV fuel (HNF-SD-SNF-TI-058, *A Discussion of the Methodology for Calculating Radiological and Toxicological Consequences for the Spent Nuclear Fuel Project at the Hanford Site*). The only other radionuclides of significance are Sr-90 and Cs-137. Only the five radionuclides that are the dose drivers, uranium, Sr-90, and Cs-137, are included in the calculation. Uranium, Sr-90, and Cs-137 were included in the inventory for completeness only; they are not the dose drivers and contribute less than 10% of the potential dose. Two isotopes, Na-24 and K-42, were produced during exposure of NaK to the reactor neutron flux, but both have half-lives less than 24 hours and both decay to stable products; therefore, they are not included in the inventory.

It is assumed that 100% of the calculated radionuclide inventory is available for release and release fractions are applied as follows:

- A release fraction of 1E-06 is applied to 95% of the radionuclide inventory as the test specimens are considered to be a solid, except for Cs-137. The test specimens have not been exposed to air, and oxides (particulates) would not have formed. The test specimens would not be friable based on the known exposures associated with the production tests.

- A release fraction of 1E-03 for particulates is applied to 5% of the radionuclide inventory to be conservative.

- A release fraction of 1E-03 is applied to 100% of the Cs-137 inventory in the test specimen as the Mark III will be heated to ~250 °F, which is above the melting point for this radionuclide. This temperature is well below the melting point for all other radionuclides and an order of magnitude below the boiling point of all radionuclides. This is a very conservative assumption as the test specimens are a solid, and all of the Cs-137 would have to migrate out of the test specimen. The condensed steam and reacted materials

are evacuated from the Mark III and collected in a condensate tank followed by a venturi scrubber. The water in both the condensate collection vessel and the venturi scrubber serves to cool the evacuated materials. It is likely that if any of the Cs-137 melted and migrated out of the test specimen, it would be in the form of entrained liquid droplets that would remain either in the condensate trap or venturi scrubber.

- A release fraction of 1E-03 for particulates is applied to all of the removable contamination that is present on the outside of the test specimens. All of the alpha activity is assumed to be Am-241 and all the beta/gamma activity is assumed to be Sr-90 and daughter product Y-90.

The assumptions concerning the release fractions for the inventory in the test specimens are based on previous tests and studies conducted on the Hanford Site in the 1950s and 1960s. These previous experiments are applicable to the proposed NaK treatment process for the following reasons:

- Capsules used in experiments are similar in design to specimens found at the 100-D Area.
- NaK/water reaction used in experiments is more energetic than the NaK/steam reaction.
- Maximum measured temperature in proximity to NaK/water reaction site of 400 °C is significantly below the 1200 °C peak cladding temperature limit criterion in 10 CFR 50 to prevent runaway oxidation in a loss of coolant accident.
- Oxidation studies have shown that stainless steel (used in capsule failure experiments) behaves similarly to zircaloy below 800 °C.

Two series of tests were completed to determine (1) safe methods for processing NaK-containing fuels in the nonproduction fuel (NPF) processing program and (2) the characteristics and consequences of a NaK-filled capsule failure within a reactor process tube. The specimens found at the 100-D Area are believed to be irradiated capsules similar in design to the capsules tested in the second program. Testing of the NaK-water reaction in the first program (HW-66562) was performed by hack sawing through capsules containing NaK that were in a shallow water bath in a submerged hood. Twenty capsules containing a 1.5-in.-long by 0.425-in.-diameter U-Mo fuel slug clad in stainless steel were cut in final prototype tests as part of this program. Inspection of the slugs after cutting showed that the reaction had no visible affect on the U-Mo material, which supports the conclusion that the test specimens are a solid with a release fraction of 1E-06. The dimensions of these fuel slugs are very similar to those of the slugs believed to be present in the 100-D specimens. Testing of the NaK-water reaction in the second program (HW-56588, HW-67721, HW-67717) was performed by perforating the NaK-containing chamber and allowing the NaK to react with water in a reactor process tube. This program demonstrated that an explosion was not a concern for NaK/water reactions after a capsule failure and that temperatures adjacent to the reaction point did not exceed 400 °C (≈750 °F). This supports the conclusion the NaK treatment process will not exceed temperatures above the melting point for any radionuclide other than Cs-137, and will not exceed temperatures that would result in the emission of radionuclides as a gas.

DUN-3955, *Fission Product Release Rate from Aluminum Clad Uranium Fuel*, presents the data and some conclusions from initial tests on fission product release rates from irradiated fuel heated to temperatures of about 1000 °C. Three of these tests provide data on the range of

releases expected for cesium for metallic uranium fuel that does not melt. The total percentage of cesium released during heating from about 650 °C to goal temperature of about 1000 °C, holding at goal temperature for 10 to 20 minutes and subsequent cool down averaged 0.021% (2.1E-04). The percentage of cesium released during heating from 650 °C to goal temperature ranged from 0.00008% to 0.008% (8E-07 to 8E-05). The average cesium release during this heating period to goal temperature was about 0.003% (3E-05). Based on this test data the assumption of 1E-03 for Cs-137 assumed for the NaK treatment process is conservative as the Mark III will be heated to ~250 °F.

The potential total unabated effective dose equivalent (TEDE) to an offsite MEI, assumed to be located at 10,114 m west-northwest at the site boundary, is estimated to be 3.3E-05 mrem/yr (0100D-CA-V0427) (Table A-1). The potential TEDE to a potential river receptor is 7.95E-04 mrem/yr (0100D-CA-V0431) (Table A-2). Since this PTE is less than 0.1 mrem/yr, the technology standards identified above must be met only to the extent justified by a cost/benefit evaluation. The following section addresses the cost/benefit evaluation requirement. The abated offsite MEI and river receptor doses are 3.3E-07 mrem/yr and 7.95E-06, respectively, based on the adjust factor to emissions for high-efficiency particulate air (HEPA) filters from 40 CFR 61, Appendix D.

3.0 COST/BENEFIT EVALUATION

The cost/benefit evaluation follows the methodology used for the Tanker Truck Notice of Construction (NOC) as documented in correspondence from the U.S. Department of Energy, Richland Operations Office (DOE-RL) to the Washington State Department of Health (WDOH) (05-AMCP-0041).

The cost for a system to exhaust the NaK containment structure that meets the technology standards listed above, is compared to: "...the most commonly used value in the U.S. is $1,000 per person-rem" (DOE/EV/1830-T5 as referenced in WAC 246-247-130). Accounting for inflation, $1,000 in 1980 would be equivalent to ~$2750 in 2011. If the cost is above $2,750 per person-rem, then generally the dose reductions are not considered cost beneficial.

(Cost escalation from U.S. Bureau of Labor Statistics:
http://www.bls.gov/data/inflation_calculator.htm)

The WDOH recently approved, via AIR 11-913, two stages of HEPA filtration as BARCT for particulate radionuclide emissions from newly constructed units required to meet the technology standards listed above as documented in DOE/RL-2001-57, *Radioactive Air Emissions Notice of Construction for the Transuranic Waste Retrieval Project*. The cost for the next generation retrieval exhauster approved by AIR 11-913 is $211,100 (Table A-3) and is used in the following cost/benefit analysis.

3.1 COST/BENEFIT EVALUATION FOR A RECEPTOR LOCATED AT THE RIVER

The following is the calculated cost/benefit evaluation based on a dose to potential receptors at the Columbia River.

Person-rem:

Estimated dose of 7.95E-04 mrem/yr (100D-CA-V0427) to river receptor / 1000 = 7.95E-07 rem/yr

7.95E-07 rem/yr x 450 fishermen on the river = 3.58E-04 person rem/yr

NOTE: The number of fishermen on the river is based on U.S. Fish and Wildlife information concerning peak use during peak fall salmon fishing season.

NOTE: Tank Truck NOC cost/benefit analysis reduced this number by a factor of 100 as ON AVERAGE population receives 1% of the MEI dose. That factor was not applied here.

Cost per person-rem reduced:

Cost of compliant exhauster system $211,100/3.58E-04 person rem/yr = $589,664,805 per person-rem reduced. This value is above the $2,750 per person-rem benefit; therefore, a system that meets all of the technology standards is not proposed for the NaK treatment process.

3.2 COST/BENEFIT EVALUATION FOR THE OFFSITE MEI

Person-rem:

Estimated dose of 3.30E-05 mrem/yr (0100D-CA-V0431) to the offsite MEI / 1000 = 3.30E-08 rem/yr

3.30E-08 rem/yr x 482,000 population (RL 2009) = 1.59E-02 person rem/yr

NOTE: Tank Truck NOC cost/benefit analysis reduced this number by a factor of 100 as ON AVERAGE population receives 1% of the MEI dose. That factor was not applied here.

Cost per person-rem reduced:

Cost of compliant exhauster system $211,100/1.59E-02 person rem/yr = $113,276,730 per person rem reduced. This value is above the $2,750 per person-rem benefit; therefore, a system that meets all of the technology standards is not proposed for the NaK treatment process.

4.0 PROPOSED BARCT

The planned activities will be conducted in a ventilated enclosure that is operated under negative pressure with HEPA filtration. As discussed above, HEPA filtration has been approved by WDOH as BARCT for radionuclide particulate emissions as recently as September 2011. There is only one exhaust point for the ventilated enclosure, which is through a HEPA-filtered exhauster that is considered BARCT for this project.

The enclosure is a 12-ft by 12-ft by 12-ft metal structure with a window that has been designed and engineered specifically for radiological controlled operations. This type of structure has been used on the Hanford Site and for projects in other parts of the country involving radiological material.

ASME/ANSI AG-1

The exhauster that is proposed for use is an OmniAire 600V, certified to ANSI Z9.2-2006. The HEPA filter does not meet the American Standard Mechanical Engineer/American National Standard Institute AG-1, Section FC. This section of the code provides minimum requirements for the performance, design, construction, acceptance testing, and quality assurance for HEPA filters used in nuclear safety related air or gas treatment systems in nuclear facilities. The HEPA filter used in the OmniAire 600V meets industry standards for asbestos work. HEPA filters that meet asbestos standards are required to remove 99.97% of 0.3 micron monodispersed particles, which is equivalent to the nuclear-grade HEPA filter standards. These types of exhaust units are commonly used on the Hanford Site for control of radionuclides in environments where the PTE is less than 0.1 mrem/yr, such as for the NaK treatment process. The OmniAire 600V HEPA filter is certified to remove 99.99% of 0.3 micron monodispersed particles, which is a greater efficiency than the nuclear-grade HEPA filter standards. The as installed OmniAire 600V HEPA filter was also tested on the Hanford Site and was found to remove >99.95% of 0.7 monodispersed particles with an average flow rate of 291 cfm.

The ducting that is connected to the exhauster and ventilated enclosure is composed of polyvinyl chloride (PVC) and is rated for 2 in. Hg (vacuum), and is deemed to be compatible with the flow rates and materials being handled in the ventilated enclosure. There is no chemical incompatibility with this ducting, no physical hazard to the ducting from the material anticipated to pass through the ducting, and there are no flammable liquids used in the operation. While this ducting is deemed to be adequate for the proposed work, it does not meet the AG-1 standards.

While the asbestos standards do not require compliance with radiation resistance and fire resistance found in nuclear-grade HEPA filters and ducting, the HEPA filters and ducting for this project will not be subjected to extremes of radiation or temperature. Dose rates and temperature will be continuously monitored during process activities as discussed below.

The dose rates will be monitored utilizing two MGPI DMC2000S Electronic Dosimeters with one located near the Mark III and the other near the NDS containment. The dose rate readings will be transmitted to a remote digital readout location, outside of the ventilated enclosure that houses the Mark III and NDS containment. Remote real-time dose rate monitoring will provide early indications of changes in dose rates in the work area and associated processing equipment, to verify that the HEPA filters and ducting were not exposed to extremes

of radiation. The DMC2000S electronic dosimeters monitor gamma and X-ray radiation with energies from 60 keV to 6 MeV with a dose rate measurement range from 1 mrem/hr to 100 rem/hr.

The temperature and moisture content of the treatment system exhaust will be inconsequential relative to the volume of ambient air flowing through the ventilation system. However, the temperature of the air exhausted from the venturi scrubber and the temperature inside of the Mark III chamber will be monitored continuously during NaK deactivation. Temperature readings will be transmitted to a remote digital readout location at the control operation station, outside of the ventilated enclosure that houses the Mark III chamber and containment control system (CCS).

Differential pressure (DP) gauges are mounted in both of the exhausters and monitor the operation of the HEPA filters. In addition, a DP gauge manufactured by Dwyer and calibrated to NIST with a measurable range of 0.00 to 20.008 in. water column (W.C.), with an accuracy of 0.5% will be located on the inlet and outlet stream of the OmniAire 600V HEPA filter. Both DP gauges are used to monitor the pressure drop across the HEPA filter in OmniAire 600V. The pressure drop is continuously monitored, and the readings are transmitted to a remote digital readout location at the control operation station, outside of the ventilated enclosure that houses the Mark III chamber and NDS containment.

The disassembly of the treated test specimens is conducted in the NDS containment that is exhausted to a separate HEPA-filtered Mini Force II exhauster located inside the HEPA-ventilated 12-ft by 12-ft by 12-ft enclosure. It does not ventilate to the environment. The discussion above for the OmniAire 600V applies to the Mini Force II. The as-installed Mini Force II HEPA filter was also tested on the Hanford Site and was found to remove >99.95% of 0.7 monodispersed particles with an average flow rate of 209 cfm.

ASME/ANSI N509 and N510

The HEPA filters do not comply with ASME/ANSI N509 and N510. However, the HEPA filters are tested in-place to demonstrate they meet the performance requirements of ANSI/ASME N510 with a DOE-approved challenge aerosol. The test in these procedures determines aerosol penetration as a result of leakage through or around the filter unit due to faulty installation, defect in the filter unit mounting frame and housing, or defects and/or damage to the individual filter units. Although these procedures are not strictly N510 tests, the procedures are used throughout the Hanford Site and are proposed as adequate to demonstrate the HEPA filtration system is operating properly and meets the intent of N510. Hence, it is proposed that adherence to these procedures adequately demonstrates that the HEPA filtration systems are operating properly and is compatible with the standard. The HEPA filters installed in the exhaust units have been efficiency tested at the Hanford Site to demonstrate a minimum efficiency of 99.95% for removal of test aerosol with a minimum median diameter of 0.7 microns.

ANSI/ASME NQA-1

The exhaust system was not procured from an NQA-1 supplier.

As described in Section 7.0, air monitoring will be conducted during the NaK treatment process. The near-facility air monitor samples are collected and analyzed in accordance with the site-

wide environmental monitoring program and quality assurance requirements are addressed in MSC-2333 (latest revision). In addition, low-volume air sampling will be conducted in the ventilated enclosure, at the exhaust outlet and at the boundary of the work location. Smears and surveys will be taken, and dose rates will be monitored. Quality assurance for these activities is addressed in ENV-1, *Environmental Monitoring & Management*, ENV-1-1.15, "Quality Assurance Project Plan for Radiological Air Emissions Monitoring."

ANSI N13.1 1999

There is no sampling system on the OmniAire 600V. The PTE is less than 0.1 mrem/yr; therefore, the sampling criteria in ANSI N13.1 are not applicable. The methods discussed in Section 7.0 of this NaK treatment plan will be used to provide periodic confirmatory measurements of low emissions.

40 CFR 60, Appendix A Test Methods 1, 1A, 2, 2A, 2C, 2D and 4

The OmniAire 600V does not have a stack that can be tested using 40 CFR 60 Appendix A methods. Therefore, these methods are not applicable. Instead, air flow measurements are incorporated into the HEPA filter test procedures referred to previously addressing ASME/ANSI N510.

5.0 REFERENCES

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Table A-1. Estimated Release Rates and Unabated Total Effective Dose Equivalent for the Offsite Maximally Exposed Individual.

Isotope	Total Radionuclide Activity (Ci)[a]	Solids (Using 1E-06 RF)			Particulates/Liquids (Using 1E-03 RF)			Surface Removable Particulates (Using 1E-03 RF)			Total PTE (Ci/yr)	Unabated TEDE to the MEI[b] (mrem/yr)
		Radionuclide Activity (Ci)	RF	PTE (Ci/yr)	Radionuclide Activity (Ci)	RF	PTE (Ci/yr)	Total Radionuclide Activity (Ci)[c]	RF	PTE (Ci/yr)		
Am-241	4.07E-02	3.86E-02	1.00E-06	3.86E-08	2.03E-03	1.00E-03	2.03E-06	2.74E-06	1.00E-03	2.74E-09	2.08E-06	6.40E-06
Ba-137m	2.91E+00	2.77E+00	1.00E-06	2.77E-06	1.46E-01	1.00E-03	1.46E-04				1.48E-04	6.91E-06
Cs-137[d]	3.08E+00				3.08E+00	1.00E-03	3.08E-03				3.08E-03	1.10E-06
Pu-238	5.42E-03	5.15E-03	1.00E-06	5.15E-09	2.71E-04	1.00E-03	2.71E-07				2.76E-07	3.04E-09
Pu-239	6.43E-02	6.11E-02	1.00E-06	6.11E-08	3.22E-03	1.00E-03	3.22E-06				3.28E-06	1.21E-05
Pu-240	2.48E-02	2.35E-02	1.00E-06	2.35E-08	1.24E-03	1.00E-03	1.24E-06				1.26E-06	4.66E-06
Pu-241	1.33E-01	1.26E-01	1.00E-06	1.26E-07	6.64E-03	1.00E-03	6.64E-06				6.77E-06	4.50E-07
Pu-242	2.76E-06	2.62E-06	1.00E-06	2.62E-12	1.38E-07	1.00E-03	1.38E-10				1.41E-10	0.00E+00
Sr-90	2.61E+00	2.48E+00	1.00E-06	2.48E-06	1.31E-01	1.00E-03	1.31E-04	4.93E-08	1.00E-03	4.93E-11	1.33E-04	3.50E-07
U-234	6.88E-04	6.54E-04	1.00E-06	6.54E-10	3.44E-05	1.00E-03	3.44E-08				3.51E-08	9.10E-09
U-235	4.04E-05	3.84E-05	1.00E-06	3.84E-11	2.02E-06	1.00E-03	2.02E-09				2.06E-09	4.69E-10
U-238	2.83E-04	2.69E-04	1.00E-06	2.69E-10	1.42E-05	1.00E-03	1.42E-08				1.44E-08	3.04E-09
Y-90	2.61E+00	2.48E+00	1.00E-06	2.48E-06	1.31E-01	1.00E-03	1.31E-04	4.93E-08	1.00E-03	4.93E-11	1.33E-04	7.35E-08
												3.30E-05

[a] Inventory taken from Table 2 of 0100D-CA-V0427, *Total Effective Dose Equivalent for the Treatment of NaK-Filled Specimens in the 100-D Area*, Rev. 1.

[b] The annual unabated total effective dose equivalent was determined using the CAP88-PC, Version 3 model. The potential to emit (Ci/yr) was input to the model, and the model generated the annual unabated dose. The distance to the MEI for the treatment of NaK targets at the 100-D Area is 10,114 m west-northwest. The CAP88-PC model summary and synopsis are presented in Calculation 0100D-CA-V0427, *Total Effective Dose Equivalent for the Treatment of NaK-Filled Specimens in the 100-D Area*, Rev. 1.

[c] Sheets 8 and 9 of 0100D-CA-V0427 show how removable activity was calculated. Assumed all alpha activity is Am-241 and all beta/gamma activity is Sr-90.

[d] Because the Mark III containment vessel is heated to ~ 250 °F, it is conservatively assumed that all Cs-137 is subject to temperatures above its melting point; therefore, a release fraction of 1E-03 has been applied.

Table A-2. Estimated Release Rates and Unabated Total Effective Dose Equivalent for a River Receptor.

Isotope	Total Radionuclide Activity (Ci)[a]	Solids (Using 1E-06 RF)			Particulates/Liquids (Using 1E-03 RF)			Surface Removable Particulates (Using 1E-03 RF)			Total PTE (Ci/yr)	Unabated TEDE to the MEI[b] (mrem/yr)
		Radionuclide Activity (Ci)	RF	PTE (Ci/yr)	Radionuclide Activity (Ci)	RF	PTE (Ci/yr)	Total Radionuclide Activity (Ci)[c]	RF	PTE (Ci/yr)		
Am-241	4.07E-02	3.86E-02	1.00E-06	3.86E-08	2.03E-03	1.00E-03	2.03E-06	2.74E-06	1.00E-03	2.74E-09	2.08E-06	1.56E-04
Ba-137m	2.91E+00	2.77E+00	1.00E-06	2.77E-06	1.46E-01	1.00E-03	1.46E-04				1.48E-04	1.58E-04
Cs-137[d]	3.08E+00				3.08E+00	1.00E-03	3.08E-03				3.08E-03	2.68E-05
Pu-238	5.42E-03	5.15E-03	1.00E-06	5.15E-09	2.71E-04	1.00E-03	2.71E-07				2.76E-07	2.29E-05
Pu-239	6.43E-02	6.11E-02	1.00E-06	6.11E-08	3.22E-03	1.00E-03	3.22E-06				3.28E-06	2.96E-04
Pu-240	2.48E-02	2.35E-02	1.00E-06	2.35E-08	1.24E-03	1.00E-03	1.24E-06				1.26E-06	1.14E-04
Pu-241	1.33E-01	1.26E-01	1.00E-06	1.26E-07	6.64E-03	1.00E-03	6.64E-06				6.77E-06	1.1E-05
Pu-242	2.76E-06	2.62E-06	1.00E-06	2.62E-12	1.38E-07	1.00E-03	1.38E-10				1.41E-10	0.00E+00
Sr-90	2.61E+00	2.48E+00	1.00E-06	2.48E-06	1.31E-01	1.00E-03	1.31E-04	4.93E-08	1.00E-03	4.93E-11	1.33E-04	8.53E-06
U-234	6.88E-04	6.54E-04	1.00E-06	6.54E-10	3.44E-05	1.00E-03	3.44E-08				3.51E-08	2.2E-07
U-235	4.04E-05	3.84E-05	1.00E-06	3.84E-11	2.02E-06	1.00E-03	2.02E-09				2.06E-09	1.14E-08
U-238	2.83E-04	2.69E-04	1.00E-06	2.69E-10	1.42E-05	1.00E-03	1.42E-08				1.44E-08	3.04E-09
Y-90	2.61E+00	2.48E+00	1.00E-06	2.48E-06	1.31E-01	1.00E-03	1.31E-04	4.93E-08	1.00E-03	4.93E-11	1.33E-04	7.4E-08
												7.95E-04

[a] Inventory taken from Table 2 of 0100D-CA-V0431, *Total Effective Dose Equivalent for the Treatment of NaK-filled Specimens in the 100-D Area (River)*, Rev. 0.

[b] The annual unabated total effective dose equivalent was determined using the CAP88-PC, Version 3 model. The potential to emit (Ci/yr) was input to the model, and the model generated the annual unabated dose. The distance to the MEI for the treatment of NaK targets at the 100-D Area is 10,114 m west-northwest. The CAP88-PC model summary and synopsis are presented in Calculation 0100D-CA-V0431, *Total Effective Dose Equivalent for the Treatment of NaK-filled Specimens in the 100-D Area (River)*, Rev. 0.

[c] Sheets 8 and 9 of 0100D-CA-V0431 show how removable activity was calculated. Assumed all alpha activity is Am-241 and all beta/gamma activity is Sr-90.

[d] Because the Mark III containment vessel is heated to 250 °F, it is conservatively assumed that all Cs-137 is subject to temperatures above its melting point; therefore, a release fraction of 1E-03 has been applied.

Table A-3. Cost for Next Generation Exhauster.

Detail	Cost	Cost Basis
Design work	$9,000	Actuals
Procure HEPA Demister/Heater Assembly	$98,000	Actuals
Procure Tent Exhauster	$27,000	Actuals
Procure HEPA Filter Housing	$32,000	Actuals
Procure HEPA Filters	$1,100	Actuals
Procure Monitoring System	$19,000	Quote
Prepare Compliance Matrix	$25,000	ROM
Total Cost	**$211,100**	

HEPA = high-efficiency particulate air
ROM = Rough Order of Magnitude Estimate

Attachment 7

163532

^WCH Document Control

From: Saueressig, Daniel G
Sent: Thursday, January 12, 2012 8:52 AM
To: ^WCH Document Control
Subject: FW: 100-D-30 Proposed Sampling
Attachments: 0100D-DD-0735 (100-D-30).pdf

Please provide a chron number (and include the attachments). This email documents a regulatory agreement and supersedes CCN# 163461.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Kapell, Arthur (ECY) [mailto:akap461@ECY.WA.GOV]
Sent: Thursday, January 05, 2012 2:30 PM
To: Laurenz, Julian E; Boyd, Alicia; Howell, Theresa Q; Post, Thomas C; Thompson, Wendy S
Cc: Beasley, Michael E; Saueressig, Daniel G; Woolery, Donald W
Subject: RE: 100-D-30 Proposed Sampling

Julian,

My apologies – I had meant to include my approval for the staging piles as identified on drawing 0100D-DD-C0735. With regards to the number of samples, unless you can provide a reason why three samples cannot be collected, three samples should be collected.

Artie Kapell
Nuclear Waste Program
Washington State Department of Ecology
(509) 372-7972
(509) 372-7971 Fax

From: Laurenz, Julian E [mailto:jelauren@wch-rcc.com]
Sent: Thursday, January 05, 2012 2:28 PM
To: Kapell, Arthur (ECY); Boyd, Alicia (ECY); Howell, Theresa Q; Post, Thomas C; Thompson, Wendy S
Cc: Beasley, Michael E; Saueressig, Daniel G; Woolery, Donald W
Subject: RE: 100-D-30 Proposed Sampling

Artie,

Thanks for the quick response. A couple of questions:

- Does this e-mail also allow WCH to use the staging/stockpiles for ACL material?
- Do we have the flexibility to collect one sample if conditions warrant? Again, we'll make all efforts possible to collect the three samples from each interval.

Thanks,
Julian

From: Kapell, Arthur (ECY) [mailto:akap461@ECY.WA.GOV]
Sent: Thursday, January 05, 2012 1:42 PM
To: Laurenz, Julian E; Boyd, Alicia; Howell, Theresa Q; Post, Thomas C; Thompson, Wendy S
Cc: Beasley, Michael E; Saueressig, Daniel G; Woolery, Donald W
Subject: RE: 100-D-30 Proposed Sampling

Julian,

I concur with your strategy for sampling at 5 foot intervals in accordance with the Tier 2 Excavation Plan drawing 0100D-DD-C0735. I do not see any compelling reason however why you cannot collect three evenly spaced samples at each 5 foot interval rather than one composite, making your best efforts to avoid material sloughing from the sidewalls.

Artie Kapell
Nuclear Waste Program
Washington State Department of Ecology
(509) 372-7972
(509) 372-7971 Fax

From: Laurenz, Julian E [mailto:jelauren@wch-rcc.com]
Sent: Wednesday, January 04, 2012 6:55 PM
To: Boyd, Alicia (ECY); Howell, Theresa Q; Kapell, Arthur (ECY); Post, Thomas C; Thompson, Wendy S
Cc: Beasley, Michael E; Saueressig, Daniel G; Woolery, Donald W
Subject: 100-D-30 Proposed Sampling

All,

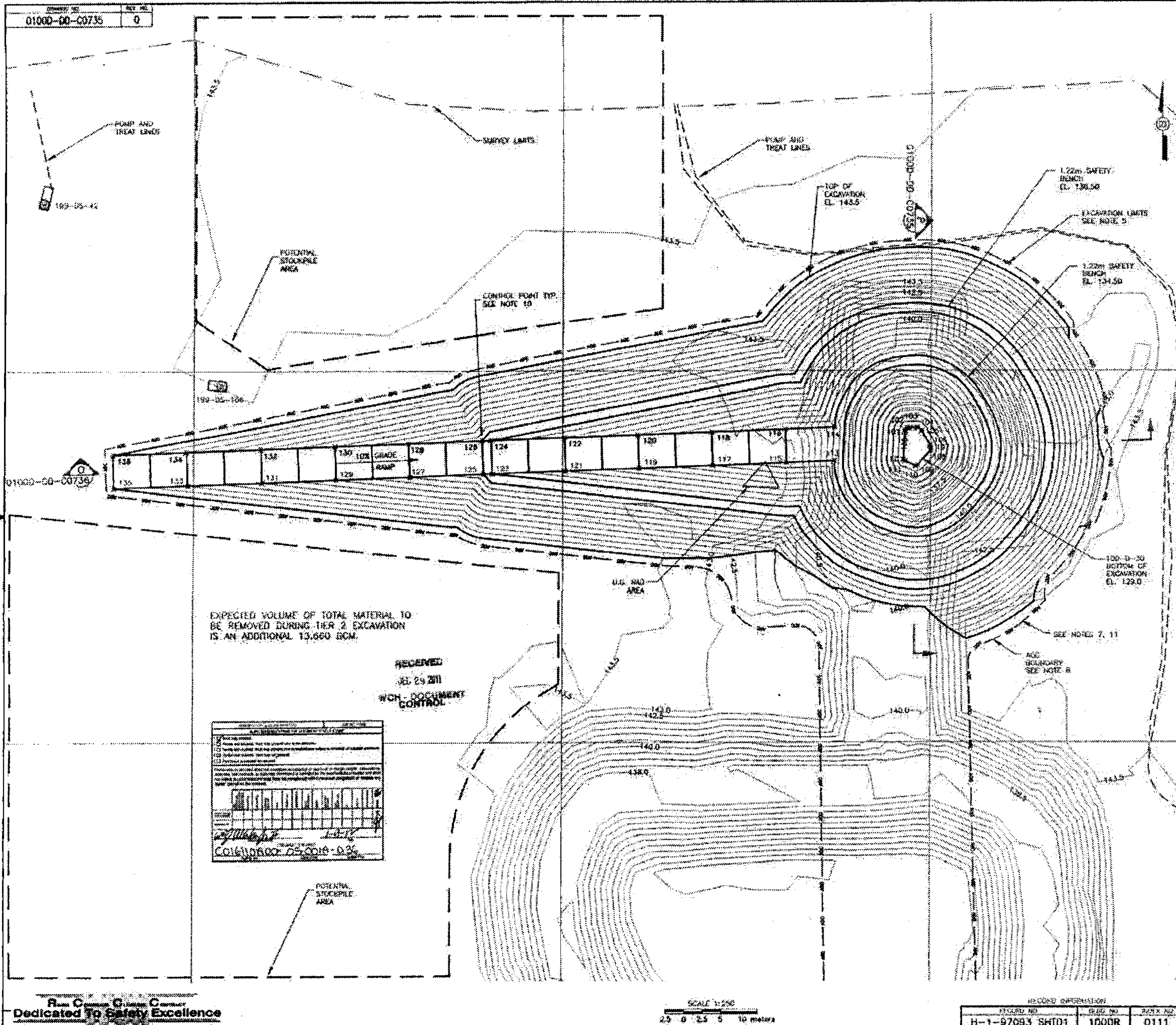
Per our discussion in today's meeting, I'd like to propose the following sampling strategy for our upcoming 100-D-30 remediation:

- Sample at 5 foot intervals.
- At each 5 foot interval, collect three evenly spaced samples across the floor. If conditions (e.g, material sloughing) don't allow three samples to be collected, collect one composite sample of the floor.
- Analyze all samples for hex. chrom and total chrome.

If you are good with this strategy, and with the staging/stockpile areas shown on the drawings this afternoon,

please provide concurrence by no later than 1/11/12.

Thanks,
Julian



NOTES

1. SEE DRAWING 0100D-DD-G0038 FOR DRAWING INDEX.
2. SEE DRAWING 0100D-DD-G0039 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
3. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100D-SP-C0005.
4. SUBCONTRACTOR SHALL REMOVE OR RE-LOCATE POWER POLES IF NECESSARY AS PER DIRECTION OF CONTRACTOR AND UTILITY OWNER.
5. RUNON/RUNOFF CONTROL BERM. CONSTRUCT AS REQUIRED. SEE DETAIL ON DRAWING NO. 0100D-DD-C0385.
6. STAGING OF WASTE SHALL OCCUR WITHIN THE ACC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE ACC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
7. SEE DRAWING NO. 0100D-DD-C0600 FOR STOCKPILE LAYOUT AND SIZE SCHEDULE. SEE EXCAVATION PERMIT DAN11-0181 FOR REFERENCE.
8. SUBCONTRACTOR IS RESPONSIBLE FOR VERIFICATION AND PROTECTION OF ALL ABOVE AND BELOW GRADE INTERFERENCES INCLUDING WELLS, BENCHMARKS, AND EXISTING UTILITIES.
9. CONSTRUCT A MINIMUM 30 FOOT WIDE FIRE BARRIER AROUND PERIMETER. CONTRACTOR TO REMOVE ALL VEGETATION WITHIN FIRE BREAK.
10. SEE 0100D-DD-C0736 FOR WASTE SITE SURVEY CONTROL POINT COORDINATE TABLE.
11. SUBCONTRACTOR SHALL PROVIDE A DESIGN FOR ALL EXCAVATIONS THAT EXCEED 6.1 M (20 FT) IN DEPTH FROM GROUND SURFACE IN ACCORDANCE WITH SUBCONTRACT DOCUMENTS.

LEGEND

UTILITY POLE

GUY WIRE

DOCUMENT CONTROL

ISSUED FOR CONSTRUCTION

U.S. DEPARTMENT OF ENERGY
DOE RICHLAND OPERATIONS OFFICE
RIVER CORRIDOR CLOSURE CONTRACT

WASHINGTON CLOSURE HANFORD LLC. RICHLAND, WASHINGTON

TERRANEARPMC, LLC RICHLAND, WASHINGTON

100 D/DR AREA
FY10 REMAINING SITES REMEDIAL ACTION
100-D-30 TIER 2 EXCAVATION PLAN

WCH JOB NO.	DOE CONTRACT NO.	CADD FILENAME
14655	DE-AC06-05RL-14655	100C0735.DWG

AREA	DRAWING NO.	REV. NO.
100D	0100D-DD-C0735	0

RECORD NO.	BLDG NO.	INDEX NO.
H-1-97093 SHT01	100DR	0111

Attachment 8

163462

^WCH Document Control

From: Saueressig, Daniel G
Sent: Thursday, January 05, 2012 1:54 PM
To: ^WCH Document Control
Subject: FW: 100-D-100 Tier 2 Potholes

Please provide a chron number. This email documents a regulatory agreement.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Kapell, Arthur (ECY) [mailto:akap461@ECY.WA.GOV]
Sent: Thursday, January 05, 2012 1:47 PM
To: Laurenz, Julian E
Cc: Boyd, Alicia; Post, Thomas C; Woolery, Donald W; Saueressig, Daniel G
Subject: RE: 100-D-100 Tier 2 Potholes

Julian,

I concur with your logic for the selection of tier-2 potholes for D-D-100 as well as the sampling approach. Additionally, as you will be returning pothole material to its original location, the pothole material must be remediated in the tier-3 design, as you have stated.

Artie Kapell
Nuclear Waste Program
Washington State Department of Ecology
(509) 372-7972
(509) 372-7971 Fax

From: Laurenz, Julian E [mailto:jelauren@wch-rcc.com]
Sent: Wednesday, January 04, 2012 7:21 PM
To: Kapell, Arthur (ECY)
Cc: Boyd, Alicia (ECY); Post, Thomas C; Woolery, Donald W; Saueressig, Daniel G
Subject: 100-D-100 Tier 2 Potholes

Artie,

Per your request at this morning's interface meeting, I've provided additional information below on logic for selecting potholes. If you have no questions on the logic, I would like to get concurrence by 1/10/12 to proceed with potholes. Please let me know if you have any questions.

163462

Thanks,
Julian

From: Laurenz, Julian E
Sent: Tuesday, December 20, 2011 7:05 PM
To: Boyd, Alicia; 'Kapell, Arthur (ECY)'; Post, Thomas C
Subject: 100-D-100 Tier 2 Potholes

Alicia/Artie/Tom,

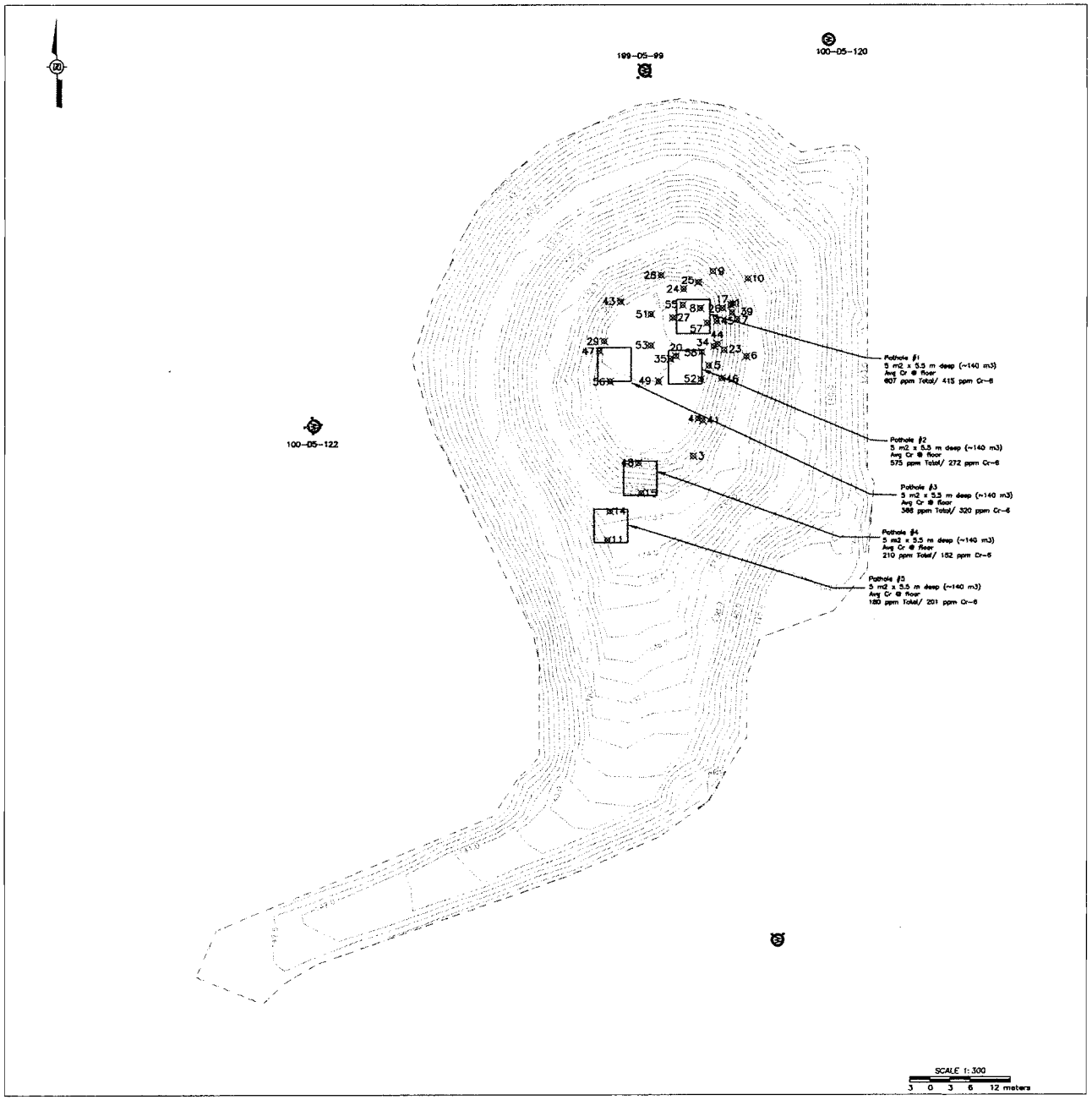
How is it going? As part of our interface meeting tomorrow, I'll be reviewing potholes we'll be digging in early January to help define Tier 3 remediation (see attached sketch). Our strategy will consist of:

- Remediating 5 potholes. Each pothole will range in depth between 15-20 feet. The five potholes were selected based on their ability to define the Tier 3 design. Although all efforts were made to pothole the highest chrome concentrations, this could be not be done in all cases because of access issues.
- For each pothole, we'll collect total and hex. chrome samples approximately every 5 feet.
- The pothole material will be returned to its original location. All the recommended pothole areas will be included in the Tier 3 design, which means they will be remediated and stockpiled. The basis for backfilling the potholes is to provide a foundation for our equipment to perform Tier 3 remediation.

We'll see you tomorrow.

Julian

<< File: 100-D-100 tier 2 post-ex with pothole locs-Layout1.pdf >>



100-D- 100 Tier 2 Exc Chromium Sample Results

Loc #	Sample	Description	Total Cr (mg/kg)	Hex Cr (mg/kg)
1	J1LJN6	Exc (30' bgs)	527	516,488
3	J1LXX5	Exc (35' bgs)	100	9,731
4	J1LXX7	Exc (35' bgs)	248	164,256
5	J1LXX8	Exc (35' bgs)	235	205,364
7	J1M000	Exc (35' bgs)	530	395,859
8	J1M001	Exc (35' bgs)	302	212,206
9	J1M002	Exc (35' bgs)	208	190,272
10	J1M003	Exc (35' bgs)	167	96,683
11	J1LJP4	Exc (S Ramp 35' bgs)	204	228,021
14	J1LJP7	Exc (S Ramp 35' bgs)	155	175,282
15	J1LJP8	Exc (S Ramp 35' bgs)	210	203,674
17	J1M0C9	Exc(40' bgs)	736	366,674
20	J1M0D3	Exc(40' bgs)	557	377,618
23	J1M0D8	Exc(40' bgs)	269	224,816
24	J1M0F0	Exc(40' bgs)	261	231,437
25	J1M0T0	Exc (45' bgs)	365	326,093
26	J1M0T1	Exc (45' bgs)	567	555,453
27	J1M0T2	Exc (45' bgs)	344	315,898
28	J1M0T3	Exc (45' bgs)	243	220,944
29	J1M0T4	Exc (45' bgs)	578	405,281
34	J1M0V0	Exc (45' bgs)	560	542,452
35	J1M0V1	Exc (45' bgs)	670	666,364
39	J1M0W5	Slopes (35-50' bgs)	380	383,552
41	J1M0W7	Slopes (35-50' bgs)	181	156,682
43	J1M0W9	Slopes (35-50' bgs)	142	11,164
44	J1M0X0	Slopes (35-50' bgs)	493	389,955
45	J1M0X1	Slopes (35-50' bgs)	774	709,416
46	J1M0X2	Slopes (35-50' bgs)	278	251,793
47	J1M0X3	Slopes (35-50' bgs)	244	170,858
48	J1M0X4	Slopes (35-50' bgs)	210	111,883
49	J1M0V5	Exc (50' bgs)	265	160,801
51	J1M0V7	Exc (50' bgs)	189	142,807
52	J1M0V8	Exc (50' bgs)	712	284,927
53	J1M0V9	Exc (50' bgs)	364	246,905
55	J1M0W1	Exc (50' bgs)	645	393,859
56	J1M0W2	Exc (50' bgs)	291	169,341
57	J1M0W3	Exc (50' bgs)	484	292,689
58	J1M0W4	Exc (50' bgs)	498	250,354

Attachment 9

100 Area D4/ISS Status
January 12, 2012

D4 (WCH)

100-N River Structures (181-N, 181-NE, and 1908-NE): Demolition of the 181-N River Pump house scheduled to begin this week by toppling the Guard Tower (181-NA) to the bench on the south side of the structure. Demolition expected to begin on the diesel pump house shortly thereafter.

182-N High Lift Pumphouse: Above grade demolition and load out 75% complete. At grade floor currently being demolished (opened up) facilitating below grade demolition which has already started.

105-N Fuel Storage Basin (FSB): Demolition and load out of north and south FSB floors approximately 70% compete. Department of Health (DOH) has indicated, through Ecology, that one of their air samples collected during FSB demolition activities on 12/1/2011 indicates an elevated level of Cs-137. WCH air samples collected next to and simultaneous with those DOH samples did not indicated elevated Cs-137. WCH is working with DOH and Ecology to determine the cause. To date, radiological controls in place have kept dose levels below ALARA goals.

105-NE Fission Products Trap (FPT): Continuing with excavation and load out around the facility to facilitate demolition. Currently completing demolition of last section of tunnels that were between 105-N Reactor Building and 117-N Exhaust Air Filter House. Actual demolition of the facility scheduled to begin within next two weeks and will include removal of additional TSD piping between the FPT and the 1303-N Spacer Silos.

105-N/109-N Reactor/Heat Exchanger Buildings (ISS): ISS complete with the exception of installing pour backs and plates below grade on west side. Installation of those pour backs and plates is pending completion of FSB. WCH currently preparing the documentation necessary to secure a subcontractor for the work.

Other Areas

400 Area: All buildings scheduled for demolition in 400 Area complete and loaded out with exception of 4702, which is currently being demolished. Completion of 4702, and demobilization from 400 Area, currently forecasted for mid February.

Attachment 10

163468

^WCH Document Control

From: Saueressig, Daniel G
Sent: Monday, January 09, 2012 6:23 AM
To: ^WCH Document Control
Cc: Faust, Toni L; Howell, Theresa Q
Subject: FW: 100-N-61 and 100-N-64 pipeline waste site colonization
Attachments: SIS updates for 100-N-64 sub-sites-1.doc; SIS updates for 100-N-61 sub-sites.doc; 100-N-61_64_Fig2.pdf; CCN-158653.pdf

Please provide a chron number (and include attachments). This email documents a regulatory agreement.

Thanks,
Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Menard, Nina (ECY) [mailto:nmen461@ECY.WA.GOV]
Sent: Friday, January 06, 2012 8:20 AM
To: Chance, Joanne C
Cc: Faust, Toni L; Boyd, Alicia; Saueressig, Daniel G
Subject: FW: 100-N-61 and 100-N-64 pipeline waste site colonization

Joanne,

I also concur with the colonization plan for 100-N-61 and 100-N-64 as described below.

Thanks,

Nina M. Menard
Environmental Restoration
WA Dept. of Ecology
509-372-7941 Office
509-420-6839 Cell

From: Chance, Joanne C [mailto:joanne.chance@RL.gov]
Sent: Tuesday, December 27, 2011 11:28 AM
To: Faust, Toni L; Boyd, Alicia (ECY)
Subject: RE: 100-N-61 and 100-N-64 pipeline waste site colonization

Toni and Alicia,

I concur with the following colonization plan for 100-N-61 and 100-N-64 as described

below and in the attachments. Thanks.

Joanne C. Chance
U.S. Department of Energy
Office of Assistant Manager for the River Corridor
825 Jadwin Ave / MSIN A3-04
Richland, WA 99352
(509) 376-0811

From: Faust, Toni L [mailto:tlfaust@wch-rcc.com]
Sent: Wednesday, December 14, 2011 1:23 PM
To: Chance, Joanne C; Boyd, Alicia
Cc: Saueressig, Daniel G; Walker, Jeffrey L; Proctor, Megan L; Buckmaster, Mark A
Subject: 100-N-61 and 100-N-64 pipeline waste site colonization

Please provide concurrence (per TPA-MP-14) for the colonization of the 100-N-61 and 100-N-64 wastes sites as discussed in the meeting earlier today. The waste sub-sites are based on geopgraphical locations not on material transferred through the pipe segments. This is being done to better facilitate the verification sampling and closeout of these waste sites and collocated wastes sites. Verification sample designs will be based on the excavated area not on the specific lines as they criss crossed each other covering the excavation. The verification sample results for each area will be used to close out all or portions (if the entire site does not lay within the excavation) of the collocated waste sites and documented in appropriate RSVPs. It is recognized that due to the size of 100-N-61:1 and 100-N-64:1 sub-site that multiple decision units may be necessary. In fact the area that covers the river road by the 181-N building was already sampled and backfilled per an agreement CCN 158653 (attached).

If you have questions please let me know. Once your concurrence is received I will submit the required form to the WIDS Analyst per procedure. Your concurrence is requested by Tuesday 112-27-2011.

Thanks toni
948-8065

<< File: SIS updates for 100-N-64 sub-sites-1.doc >> << File: SIS updates for 100-N-61 sub-sites.doc >> << File: 100-N-61_64_Fig2.pdf >> << File: CCN-158653.pdf >>

100-N-64:1 109-N South side pipelines of the 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines

The 100-N-64:1 10 in. diameter pipelines are located directly south of the 109N Heat Exchanger Building and was used as a blow-down lines from the 109N Heat Exchanger Building to the 1908-N Seal Well Outfall Structure.

Collocated waste sites and ancillary facilities.

100-N-37
100-N-29
100-N-30
100-N-61:1
100-N-64 (to be colonized)
100-N-103:1 (1 french drain on east side of 1902N)
100-N-84:1, :2, :3, :4, :5, :6, :7
Sump #2 (part of 100-N-84:5) see FSCF *D4-100N-0012*
1902N (basement)
186N (slab)
Pipeline ends at 163N and 183N foundations which were left in place by D4 (see FSCF *D4-100N-0012*

100-N-64:2 109-N East side pipelines of the 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines

The 100-N-64:2 sub-site pipelines located parallel to and directly east of the 109-N Heat Exchanger Building. This sub-site consists of a single 10 in. diameter blow-down pipelines where it leaves the 109-N Building and continues into the 10 in. diameter 100-N-64:1 pipelines. The geographical location of the 100-N-61:2 sub-site also coincides with the 100-N-62, 100-N 105-N, 109-N, 163-N, 182-N, 183-N and 184-N Underground Pipelines waste site which lays underneath.

Collocated waste sites and ancillary facilities.

100-N-62
100-N-84:1, :2, :3, :4, :5, :6
100-N-61:2
100-N-63:2 (has its own VWI = 0100N-WI-G0022) COPCs: Cadmium, chromium (total), mercury, hexavalent chromium, lead, nitrate/nitrite, sulfate, SVOC, TPH, PAH, GEA, nickel-63, strontium 90, plutonium-239/240, thorium-282, thorium 232, uranium 233/234, uranium-238, tritium

100-N-64:3 109-N West side pipelines of the 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines

The 100-N-64:3 pipelines are located west of the 109-N Heat Exchanger Building and 105-N Reactor Building. This sub-site consists of 2 in. to 32 in. pipes used to transport vent, flush, blow-down, filtered, fire line, and demineralized water between the 109-N Building, and the 1304-N Emergency Dump Tank, 1300-N Emergency Dump Basin, 107-N Basin Recirculation Facility, and the 1303-N Radioactive Dummy Burial Facility/Spacer Silos.

Collocated waste sites and ancillary facilities.

100-N-84:1, :2, :3, :4, :5, :6
118-N-1
100-N-61:3
100-N-68
100-N-63:2 (has its own VWI = 0100N-WI-G0022) COPCs: Cadmium, chromium (total), mercury, hexavalent chromium, lead, nitrate/nitrite, sulfate, SVOC, TPH, PAH, GEA, nickel-63, strontium 90, plutonium-239/240, thorium-282, thorium 232, uranium 233/234, uranium-238, tritium

100-N-61:1 109-N South side pipelines of the 100-N Water Treatment and Storage Facilities Underground Pipelines

The 100-N-61:1 pipelines are located directly south of the 109N Heat Exchanger Building and transported mainly water between the 109N Building and the water treatment and storage facilities (181-N, 182-N, 183-NA, 1900-N, and 1908N). The pipelines were also used to transfer sewer, chlorine and sump discharge waste water. These pipes vary in size 4 in. to 108 in. diameter and are mainly steel and cast iron pipes wrapped in a coal tar enamel mastic.

Collocated waste sites and ancillary facilities.

100-N-37
100-N-29
100-N-30
100-N-64:1
100-N-103:1 (1 french drain on east side of 1902N)
100-N-84:1, :2, :3, :4, :5, :6, :7
Sump #2 (part of 100-N-84:5) see FSCF *D4-100N-0012*
1902N (basement)
186N (slab)
Pipeline ends at 163N and 183N foundations which were left in place by D4 (see FSCF *D4-100N-0012*

100-N-61:2 109-N East side pipelines of the 100-N Water Treatment and Storage Facilities Underground Pipelines

The 100-N-61:2 pipelines are located parallel to and directly east of the 109-N Heat Exchanger Building. They were used to transport transported raw water to the 109N Building from the 182-N High-Lift Pump House. These pipes vary in size 4 in. to 54 in. diameter and are mainly steel wrapped in a coal tar enamel mastic. The geographical location of the 100-N-61:2 sub-site also coincides with the 100-N-62, 100-N 105-N, 109-N, 163-N, 182-N, 183-N and 184-N Underground Pipelines waste site which lays underneath.

Collocated waste sites and ancillary facilities.

100-N-62
100-N-84:1, :2, :3, :4, :5, :6
100-N-64:2
100-N-63:2 (has its own VWI = 0100N-WI-G0022) COPCs: Cadmium, chromium (total), mercury, hexavalent chromium, lead, nitrate/nitrite, sulfate, SVOC, TPH, PAH, GEA, nickel-63, strontium 90, plutonium-239/240, thorium-282, thorium 232, uranium 233/234, uranium-238, tritium

100-N-61:3 109-N West side pipelines of the 100-N Water Treatment and Storage Facilities Underground Pipelines

The 100-N-61:3 pipelines are located west of the 109-N Heat Exchanger Building and 105-N Reactor Building. This sub-site consists of a 30 in diameter emergency raw water supply pipeline from the 182-N High-Lift Pump House, and a 30 in. diameter overflow pipeline located between the 1300-N Emergency Dump Basin and the 1908-N Seal Well Outfall Structure.

Collocated waste sites and ancillary facilities.

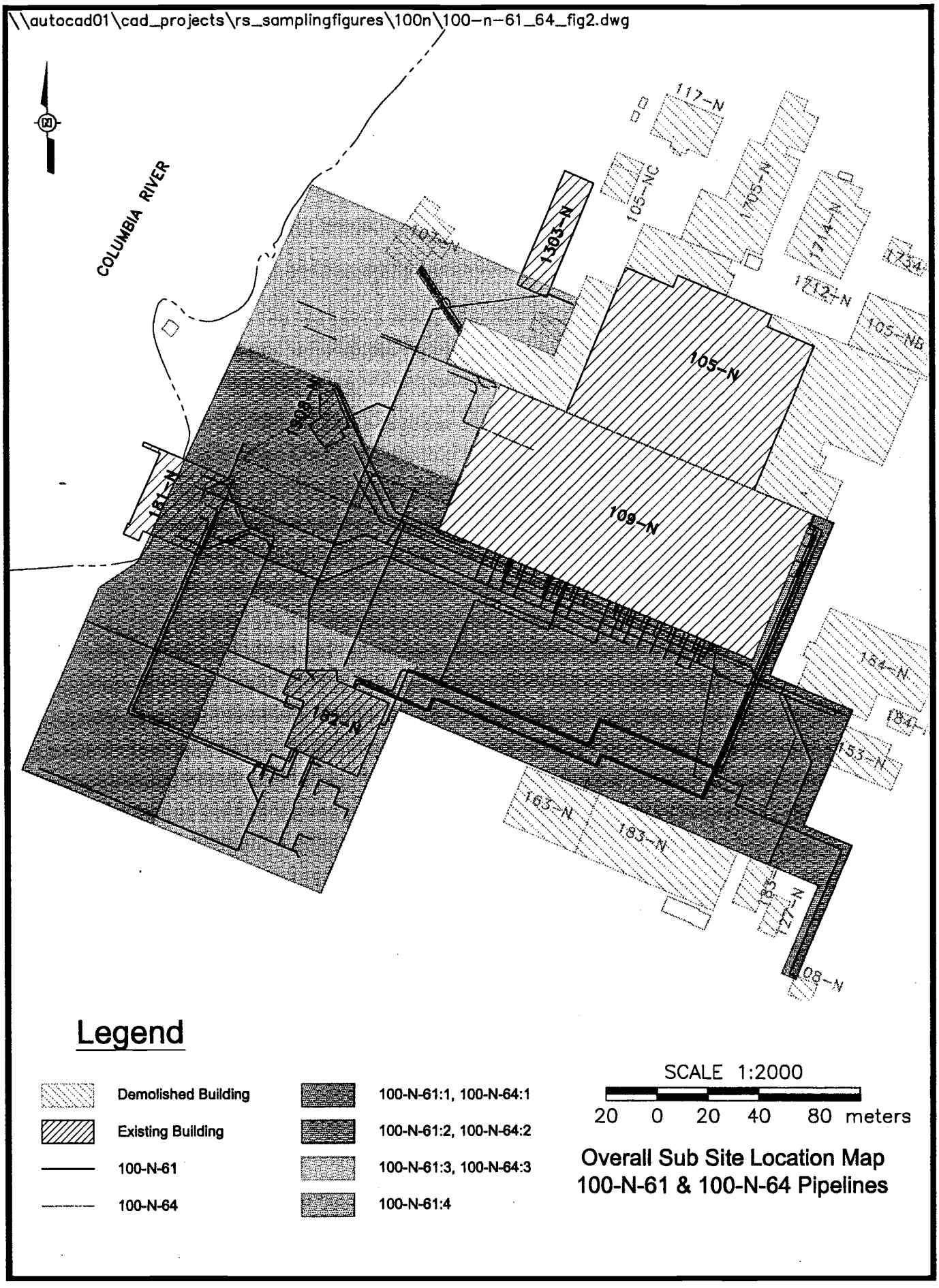
100-N-84:1, :2, :3, :4, :5, :6
118-N-1
100-N-64:3
100-N-68
100-N-63:2 (has its own VWI = 0100N-WI-G0022) COPCs: Cadmium, chromium (total), mercury, hexavalent chromium, lead, nitrate/nitrite, sulfate, SVOC, TPH, PAH, GEA, nickel-63, strontium 90, plutonium-239/240, thorium-282, thorium 232, uranium 233/234, uranium-238, tritium

100-N-61:4 182-N South side pipelines of the 100-N Water Treatment and Storage Facilities Underground Pipelines

The 100-N-61:4 pipelines are located directly south of the 182-N High-Lift Pump House and underneath the 1900-N Water Supply Tanks' foundations. These pipelines transported raw and filtered water in 4 in. to 42 in. diameter steel pipes wrapped in a coal tar enamel mastic.

Collocated waste sites and ancillary facilities.

100-N-84:1, :3, :4, :7
1900N partially removed but still has tank foundations to be removed by D4 as a TPA ancillary facility.
Pipe ends at 182N which D4 is currently taking to 3 feet below grade.


\\autocad01\cad_projects\rs_samplingfigures\100n\100-n-61_64_fig2.dwg
COLUMBIA RIVER
117-N
105-NC
1705-N
1714-N
1712-N
1734
105-NB
1383-N
107-N
105-N
109-N
181-N
182-N
154-N
153-N
163-N
183-N
127-N
108-N
Legend
Demolished Building
Existing Building
100-N-61
100-N-64
100-N-61:1, 100-N-64:1
100-N-61:2, 100-N-64:2
100-N-61:3, 100-N-64:3
100-N-61:4
SCALE 1:2000
20 0 20 40 80 meters
Overall Sub Site Location Map
100-N-61 & 100-N-64 Pipelines

^WCH Document Control 158653

From: Saueressig, Daniel G
Sent: Thursday, May 26, 2011 7:14 AM
To: ^WCH Document Control
Subject: FW: UPDATED: 100-N FR South River Road Agreement
Attachments: River Road White Paper -final 5-19-11.doc
Please provide a chron number (and include attachment). This email documents a regulatory agreement.

Thanks,

Dan Saueressig
FR Environmental Project Lead
Washington Closure Hanford
521-5326

From: Varljen, Robin (ECY) [mailto:RVAR461@ecy.wa.gov]
Sent: Thursday, May 19, 2011 3:40 PM
To: Faust, Toni L
Cc: Walker, Jeffrey L; Menard, Nina; Saueressig, Daniel G
Subject: RE: UPDATED: 100-N FR South River Road Agreement

Toni,

I am not sure what removing "during remediation" gains us when it is restated in the next sentence. Regardless, I accept this paragraph (section 4.4) as it is written below.

So, based on the document provided and current information provided to me by the FR project, I accept this agreement on Ecology's behalf. I would like notification when you have sampled, compared the analytical results to the soil RAGs and will backfill. This can be one notification or 3 individual notifications and e-mail is sufficient. Please include this white paper and e-mail in the next UMM for documentation of our agreement.

Please let me know if you have questions or comments.

Robin Varljen

Washington Department of Ecology

Nuclear Waste Program - Cleanup Section

(509) 372-7930

From: Faust, Toni L [mailto:tlfaust@wch-rcc.com]

158653

Sent: Thursday, May 19, 2011 2:27 PM
To: Varljen, Robin (ECY)
Cc: Walker, Jeffrey L
Subject: RE: UPDATED: 100-N FR South River Road Agreement

Robin

Your comment has been incorporated with minor revision. See below.

If visual evidence of contamination (e.g., staining) is observed within the pipeline excavation the stained location and approximate dimensions will be documented within the field logbook. The lead agency will be notified via email if stained areas are identified during remediation and consulted regarding decisions on additional verification focused samples in these locations.

Also since the 100-N-53 waste site RTD memo has been issued this site has been move to the appropriate portion of the white paper and the data summary table removed. Jeff read through this and I used the electronic spelling-grammar checker so I am hoping we are good to go. If you are okay with the attached please send an email and later the document can be placed in the UMM minutes to document Ecology concurrence.

Thanks toni

Remediation and Verification Sampling for Eight Waste Sites within the 100-N South River Road Boundary

1.0 PURPOSE

The purpose of this white paper is to describe the remediation, sampling and analytical requirements for portions of waste sites that lay within the 100-N south river road to support the waste site specific remaining sites verification packages (RSVPs). Remediation of the portions of the waste sites within the 100-N south river road is needed to support the demolition of the 100-N River Structures, including the 181-N building between July and September 2011.

Eleven waste sites within the 100-N south river road boundary near the 181-N building, and leading to the west side of the 105-N/109-N Reactor building have been identified as requiring removal/remediation to support Field Remediation and Deactivation, Decommission, Decontamination, and Demolition projects work schedules. Three of the 11 wastes sites (100-N-56, 181-N Building Drywell, 100-N-73, 107-N Building West Area Storm water Runoff Miscellaneous Stream #395, and 100-N-76, 181-N Pump house French Drains) have been reclassified as "Rejected/Not Accepted," and do not require sampling. These sites may be disturbed or removed during the excavation of the eight remaining waste sites.

Sampling of the eight waste sites meet the requirements specified in the *100-N Area Sampling and Analysis Plan for CERCLA Waste Sites* (100-N Area SAP) (DOE-RL 2006a) and will be documented in the site specific RSVPs. The 100-N Area SAP addresses the sampling requirements associated with the cleanup of waste sites under the *Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington* (100-N ROD) (EPA 1999).

If verification focused sample results for a specific waste site are below the remedial action goals (RAGs) for the contaminants of potential concern (COPCs) for that waste site and collocated waste sites then the excavated portion of that waste site will be backfilled.

If verification focused sample results for a specific waste site are above the RAGs, additional remediation of the waste site portion within the 100-N south river road will occur, and follow-up verification focused sampling will be performed. Remediation of each waste site portion within the 100-N south river road will not be considered complete until verification focused sample results are less than the soil RAGs. The location of the follow-up verification focused sampling will be the same as the original verification focused sample.

Interim closure of the waste sites based on verification sampling will be documented in site specific RSVPs. Documentation on these portions of pipelines covered by the above sampling will be included in the site specific RSVPs.

Should any deviation from this white paper be anticipated or undertaken, including performing additional remediation or revisions to the sampling approach, the Field Remediation project will notify the U.S. Department of Energy, Richland Operations Office and the lead regulatory agency for concurrence.

2.0 SITE DESCRIPTION

There are two categories based on waste site status, as listed below.

- Confirmatory waste sites awaiting sampling to determine if remediation will be required: 100-N-84 (subsites: 3, 5 and 7).
- Removal, Treat and Disposal (RTD) waste sites: 100-N-53, 100-N-61, 100-N-64, and 100-N-84 (subsites: 2 and 6).

A description of each of the eight waste sites identified for partial removal is as follows.

Confirmatory Waste Sites:

The 100-N-84:3 subsite consists of inactive filtered and potable water pipelines including those identified as filter water, demineralized water, potable water, and makeup water. During treatment of the raw water in the 183-N Building, liquid alum (aluminum sulphate), Separan (polyacrylamide coagulant), and liquid chlorine were added. Chlorine was added for the control of slime and algae and may have been used to assist in coagulation, odor, and iron removal problems.

The alum used at 183-N contained trace amounts of naturally occurring radium-226, radium-228, and thorium-228, which may have been Technologically Enhanced Naturally Occurring Radioactive Material (TENORM). To determine if TENORM was present, a number of samples downstream of the 183-N chemical mixing tank were taken and no detectable amounts of radioactive contamination were found.

The 186-N Potable Water Plant replaced the 183-N and 163-N facilities in 2000. Sodium hypochlorite solution was added at the 186-N facility as the chlorinating agent to control slime and algae. After operation of the 186-N Potable Water Plant began, heavy concentrations of particulates in the water were seen. A pre-filtration system located in 1902-N Building was added in 2002 to alleviate the problem.

The 100-N-84:5 subsite consist of the 100-N Area sanitary pipelines including; sanitary water, sanitary sewer, storm drains, and disposal field pipelines.

The 100-N Area was serviced by 10 separate sewer systems consisting of one cesspool, one lagoon, six septic tanks with an associated tile or drain field, and two septic tanks with seepage pits. The septic tanks, pits, cesspool, and lagoon are identified as the 124-N-1 through 124-N-10 waste sites. The 124-N-5, 124-N-6, 124-N-7, and 124-N-8 waste sites have been reclassified as Rejected. The feed and drainage pipelines associated with these waste sites are included in the 100-N-84:5 waste site.

The 100-N-84:7 pipeline subsite includes sections of various diameter pipelines that could not be positively identified based on review of historical documentation. These pipelines include those described as sample, unidentified, or multitube. In addition to the pipelines, the 100-N-84:7 subsite includes a french drain and two areas that measure between 1 and 3 m (3.3 and 10 ft) in diameter with unidentified features.

Remove, Treat and Disposal Waste Sites:

The 100-N-53 waste site is the location of a former aboveground waste oil tank that was associated with the 181-N Pump house. The 1.1 m (3.5 ft) diameter by 1.2 m (4.1 ft) high tank has been removed. Only the concrete foundation remains. The pipeline that carried the waste oil from the 181-N Building to the tank is not included as part of this waste site. The 181-N waste oil tank (also known as Waste Oil Tank No. 3), to received used lubricating oil from the engine lubrication system in the 181-N Pump house. Oil was removed from the normal lubrication system and transferred to the waste oil tank via a 3.8-cm (1.5-in)-diameter underground line. The 100-N-53 waste site has been reclassified as RTD (WCH 2011).

The 100-N-61, 100-N Water treatment and Storage Facilities Underground Pipelines waste site consist of all the underground water pipelines used to transport reactor cooling water between the Columbia River, the water treatment facilities (181-N, 182-N, 163-N, 183-N, and 1908-N) and the 105-N Reactor Building. Pipelines with the buildings and all pipelines that are downstream form the 105-N Reactor Building i.e., those lines that carry cooling water from the reactor to effluent disposal facilities such as the dump tank and cribs are excluded. A small portion of the 100-N-84:1 subsite pipeline connects to the 100-N-61 pipeline at the 181-N building. This section of pipeline is not a separate waste site since a portion of it is above grade, but will be removed.

The 100-N-64, 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines waste site consist of pipelines use to transport reactor cooling water from the 105-N Reactor facilities to 300-N and the 1304-N, Emergency Dump Basin and Tank respectively, the 107-N Filter Building and the pipelines from these facilities to the 1908-N Outfall Structure.

The 100-N-84:2 subsite consists of diesel oil supply and return, ignition oil, ignition oil supply and return, fuel oil supply and return, waste oil, and foam pipelines. In addition to the pipelines, the 100-N-84:2 subsite includes a fuel oil unloading trench.

Diesel oil unloaded from rail cars at the 166-N unloading station was transferred for storage to one of four aboveground storage tanks within the 1715-N Building. The diesel oil was then transferred through a 10.2-cm (4-in.) underground supply pipeline to the 184-N Building day tank or through 5.1-cm (2-in) and 10.2-cm (4-in.) underground pipelines to the three 56,781-L (15,000-gal) day tanks outside of the 182-N Building. The diesel fuel from the 182-N day tanks was used to support the 182-N and 181-N diesel oil systems.

Number 6 fuel oil (also known as Bunker C fuel oil) was unloaded from rail cars at the 1900-N unloading station and transferred to the 166-N building for storage in a 5,204,941-L (1,375,000-gal) capacity aboveground storage tank. The Number 6 fuel oil was transferred through underground pipelines from 166-N to two 184-N fuel oil day tanks.

The 100-N-84:6 subsite consists of pipelines for disposal of chemical waste, demineralization treatment waste, drain cold, dummy disposal line, miscellaneous chemical drain, radioactive drain, chlorine, flush, and sample pipelines. The 100-N-84:6 subsite also includes a sodium hydroxide trench and a french drain. The 100-N-84:6 pipelines originate from the 109-N Heat Exchanger Building, the 105-N Reactor Building, the 163-N Demineralization Plant, 182-N High-Lift Pump House, 183-N Filter Plant, and 184-N Plant Service Power House. Various chemicals were utilized in these buildings.

Phosphoric, ascorbic, and citric acids, and potassium permanganate were used in the 109-N and 105-N Buildings decontamination processes.

Ammonium hydroxide, morpholine, and lithium hydroxide were added to control cooling water pH. Hydrazine was added to reduce oxygen concentrations in cooling water.

Sulfuric acid and sodium hydroxide from supply tanks in 163-N building were primarily consumed in the demineralizer plant. A 93% sulfuric acid solution was used to regenerate the cation resin used at the 163-N building, while a 50% sodium hydroxide solution was used to regenerate the anion resin.

Appendix A contains the Waste Information Data System general summary report and the Stewardship Information System site summary reports.

2.1 Location

Figure 1 shows the 11 wastes sites located within the 100-N River Road.

3.0 REMEDIATION ACTION ACTIVITIES

The waste sites (i.e. pipelines and polygons) shown in Figure 1 will be excavated and removed within the boundary of the 100-N South River Road based on approved remediation design drawings to meet the remedial action objectives (RAOs) of the 100-N Area ROD (EPA 1999). Radiological field monitoring [i. e. handheld instrument surveys, Global Positioning Environmental Radiological Surveyor (GPERS)] and in-process soil samples will be used to guide the waste sites excavations and help determine if the sites excavations are ready for verification sampling.

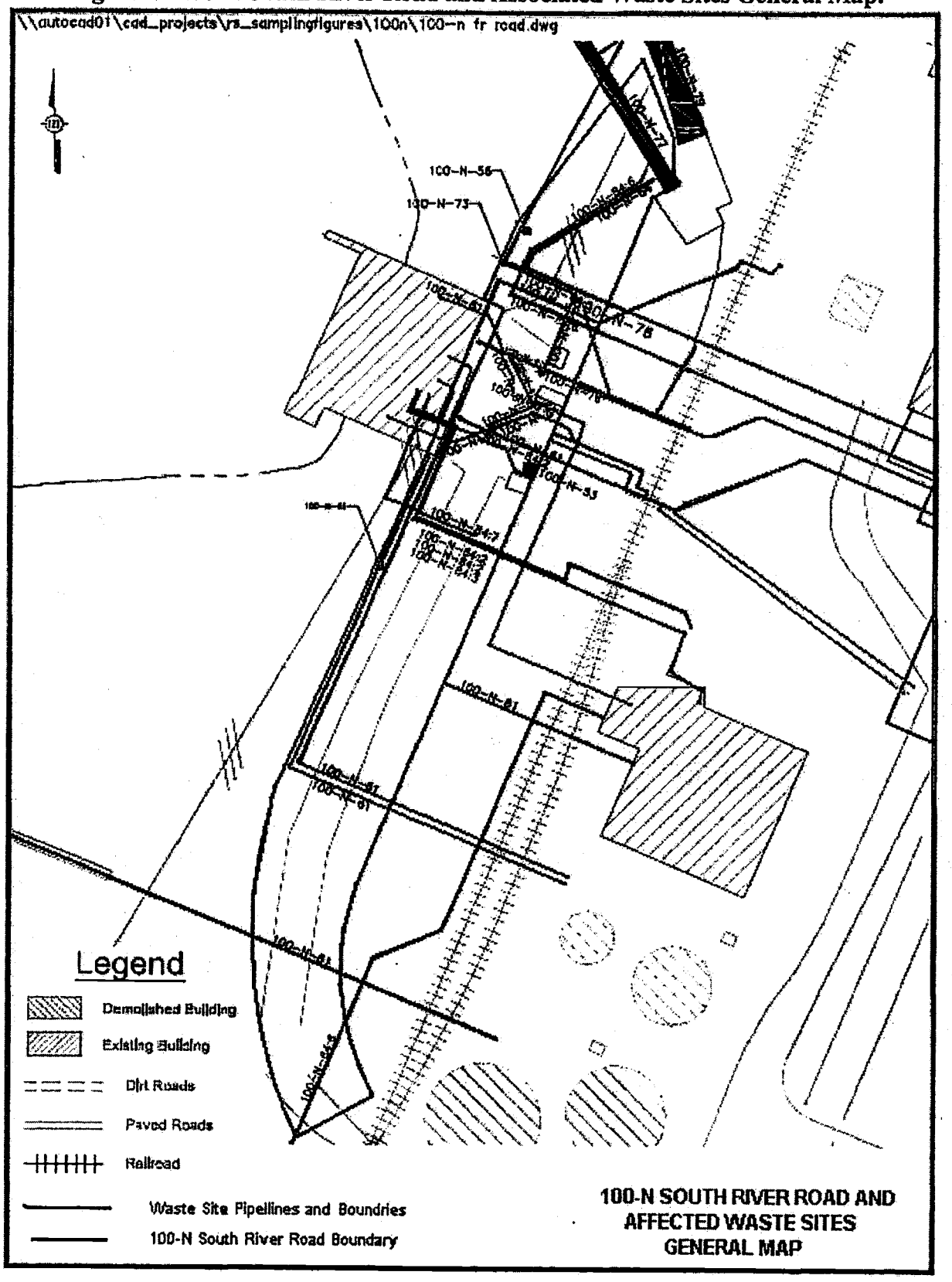
Pipelines will be excavated to the approved remediation designs for section within the boundary of the 100-N South River Road. Soil removed during excavation above the pipelines may be used as overburden. Soil adjacent to the pipeline and approximately 1 foot under the pipelines will be removed and disposed of at the ERDF along with the piping.

For confirmatory waste sites where no approved remediation design is available, the excavation will remove soil, which will result in an excavation that is a minimum 1 foot below the bottom of the pipe and has a 1.5:1 slope.

Verification focused samples collected from the excavation areas to be backfilled, will be analyzed for waste site specific COPCs using methods listed in Table 1. The results will be compared directly to the remedial action goals (RAGs) listed in the *Remedial Design Report/Remedial Action Work Plan for the 100-N Area* (100-N Area RDR/RAWP) (DOE-RL 2006b).

A summary of the waste sites remediation field activities including in process sampling, anomalies, GPERS surveys, final excavation footprint, and backfills, along with verification focused sample results will be included in the waste site specific RSVPs.

Figure 1. 100-N South River Road and Associated Waste Sites General Map.



3.1 Post-Excavation Topographic Survey

A post-excavation global positioning survey will be conducted once the waste site remediation has been completed for the portions of the eight waste sites removed within the 100-N south river road boundary. This information will be included in the waste site specific RSVPs.

4.0 VERIFICATION SAMPLING AND ANALYSIS

This section describes the requirements for verification focused sampling and analysis to support cleanup of the eight waste sites. Verification sampling will be performed to support a determination that potential residual contaminant concentrations at this site meet the cleanup criteria specified in the 100-N RDR/RAWP (DOE-RL 2006b).

4.1 Contaminants of Potential Concern

The COPCs for the waste sites were developed based on historical data and process knowledge for each waste site within the 100-N- south river road boundary are described below. The 100-N-84 waste site and it's subsites are not listed in the 100-N Area SAP.

The COPCs for the 100-N-53 waste site include copper, lead, zinc, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), and polycyclic aromatic hydrocarbons (PAH).

The COPCs for the 100-N-61 waste site include anions, total chromium, hexavalent chromium, lead, gross alpha, beta, gamma emitting radio-nuclides, strontium 90 and asbestos.

The COPCs for the 100-N-64 waste site include cobalt-60, total chromium, hexavalent chromium, and lead.

The COPCs for 100-N-84:2 are based on diesel fuel and Number 6 fuel oil being managed in these pipelines and trench. The COPCs for the 100-N-84:2 subsite are total chromium, lead, TPH, and PAH.

The 100-N-84:3 COPCs are based on historical information, previous sampling, and information from analogous waste sites (i.e. 100-D-63, 100-D/DR Service Water Pipelines and 100-H-35, 100-H Service Water Pipelines). The COPCs for the 100-N-84:3 subsite are total chromium, hexavalent chromium, and mercury.

The 100-N-84:5 COPCs are based on existing historical information for the site and information from analogous waste sites (i.e. 100-D-50:9, 1607-DR3 Sanitary Sewer Pipelines). The COPCs for the 100-N-84:5 site are lead, total chromium, hexavalent chromium, mercury, anions, pesticides, semivolatile organic compounds (SVOC), and PCBs.

The COPCs for the 100-N-84:6 subsite are total chromium, lead, and anions.

Because there is little process knowledge and historical information for the 100-N-84:7 subsite, the COPCs are based on a conservative approach. The 100-N-84:7 COPCs are lead, total chromium, hexavalent chromium, mercury, anions, nitrates/nitrites, pesticides, SVOCs, and PCBs.

Although not considered COPCs for all waste sites, analysis will be performed for the expanded list of ICP metals including antimony, arsenic, barium, beryllium, boron, cadmium, cobalt, copper, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc.

Although radionuclides are not COPCs for all waste sites within the 100-N South River Road boundary, the possible presence of radiological contaminants will be evaluated by performing strontium-90 and gamma energy analysis (GEA) of all verification focused samples.

Although not considered a COPC for all wastes sites within the 100-N South River Road boundary, historical data indicates that the pipe wrap used in the 100-N area contains asbestos. Therefore, all pipeline waste site verification focused samples will be analyzed for asbestos.

4.2 Laboratory Analytical Methods

Table 1 identifies the COPCs for verification sampling and laboratory analytical methods.

4.3 Sample Design Selection and Basis

This section describes the basis for selection of an appropriate sample design and determination of the number of verification soil samples to collect.

4.4 Verification Sample Design

Verification focused samples and duplicates will be collected as identified in Table 2. The COPCs for each verification focused sample is based on the COPCs listed for each waste site located at that verification focused sample location. Table 2 lists the waste sites at each sample location and the cumulative COPCs based on the listed wastes sites. As a result each waste site will be sample at least once with a duplicate sample.

If visual evidence of contamination (e.g., staining) is observed within the pipeline excavation the stained location and approximate dimensions will be documented within the field logbook. The lead agency will be notified via email if stained areas are identified during remediation and consulted regarding decisions on additional verification focused samples in these locations.

Figures 2 and 3 show the verification focused sample locations for the eight waste sites portions within the 100-N-south river road boundary.

4.5 Field Sampling and Analysis

All sampling will be performed in accordance with ENV-1, *Environmental Monitoring & Management* procedures consistent with the 100-N Area SAP (DOE-RL 2006a) requirements. Any deviations from this sampling design will be documented in the field logbook and the remaining sites verification package (RSVP).

Table1. Laboratory Analytical Methods.

Analytical Method	Contaminants of Potential Concern
ICP metals[a] – EPA Method 6010	Metals
Hexavalent chromium – EPA Method 7196	Hexavalent chromium
Mercury – EPA Method 7471	Mercury
IC Anions[b] – EPA Method 300.0	Inorganic anions
Nitrate/nitrite[c] – EPA Method 353.2	Nitrate/nitrite
Pesticides – EPA Method 8081	Pesticides
PCB – EPA Method 8082	Polychlorinated biphenyls
GEA – gamma spectroscopy	Gamma-emitting radionuclides
Stronium-90 – total beta radiostrontium	Strontium-90
SVOA – EPA Method 8270	SVOC
TPH[d] – EPA Method NWTPH-Dx	Petroleum hydrocarbons
PAH[d] – EPA Method 8310	Polycyclic aromatic hydrocarbons
Bulk asbestos – NIOSH Method 7400	Asbestos

a Analysis will be performed for the expanded list of ICP metals to include arsenic, antimony, barium, beryllium, boron, cadmium, chromium (total), cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc.

b Analysis will be performed for the expanded list of IC anions to include bromide, chloride, fluoride, nitrate, nitrite, phosphate, and sulfate.

c To preclude holding time issues associated with EPA Method 300.0 for nitrites and nitrates, EPA Method 353 will be performed.

d TPH and PAH analysis will be performed if oily or burned soil areas are observed unless specifically identified as a COPC in Table 2.

EPA = U.S. Environmental Protection Agency
GEA = gamma energy analysis
IC = ion exchange chromatography
ICP = inductively coupled plasma
NIOSH = National Institute for Occupational Safety and Health
NWTPH-Dx = Northwest total petroleum hydrocarbons —diesel range organics
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOA= semi- volatile organic analysis
SVOC= semi-volatile organic compound
TPH = total petroleum hydrocarbons

Table 2. 100-N South River Road Verification Focused Sample Summary (2 Pages)

Sample Number	HIES Number	Waste Site(s)	Easting	Northing	Contaminants of Potential Concern
100-N-53-1	TBD	100-N-53	571036.3	149444.4	Copper[a], lead, zinc, PAH, PCBs, TPH, GEA, strontium-90
100-N-53-2	TBD	100-N-53	571035.5	149442.8	
100-N-53-3	TBD	100-N-53	571037.0	149442.2	
100-N-53-Duplicate[c]	TBD	100-N-53	TBD	TBD	
RR-1	TBD	100-N-64, 100-N-84:5, and 100-N-84:6	571035.4	149482.8	Chromium hexavalent, chromium total[a], lead, mercury, anions[b], pesticides, PCBs, SVOC, GEA (cobalt-60), strontium-90, asbestos
RR-1-Duplicate[c]	TBD	100-N-64, 100-N-84:5, and 100-N-84:6	571035.4	149482.8	Chromium hexavalent, chromium total[a], lead, mercury, anions[b], pesticides, PCBs, SVOC, GEA (cobalt-60), strontium-90, asbestos
RR-2	TBD	100-N-61 and 100-N-84:2	571024.9	149469.1	Chromium hexavalent, chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
RR-2-Duplicate[c]	TBD	100-N-61 and 100-N-84:2	571024.9	149469.1	Chromium hexavalent, chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
RR-3	TBD	100-N-61, 100-N-76[d], 100-N-84:5	571038.9	149463.1	Chromium hexavalent, chromium total[a], lead, anions[b], SVOCs, pesticides, PCBs, GEA, strontium-90, asbestos
RR-4	TBD	100-N-61 and 100-N-84:2	571018.3	149453.2	Chromium hexavalent, chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
RR-5	TBD	100-N-84:2, 100-N-84:3, and 100-N-84:7	571013.9	149433.5	Chromium hexavalent, chromium total[a], lead, mercury, anions[b], nitrate/nitrites[e], pesticides, SVOCs, PAH, PCBs, TPH, GEA, strontium-90, asbestos
RR-5-Duplicate[c]	TBD	100-N-84:2, 100-N-84:3, and 100-N-84:7	571013.9	149433.5	Chromium hexavalent, chromium total[a], lead, mercury, anions[b], nitrate/nitrites, pesticides, SVOCs, PAH, PCBs, TPH, GEA, strontium-90, asbestos
RR-6	TBD	100-N-61	570991.1	149384.2	Chromium hexavalent, chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
RR-7	TBD	100-N-61	570987.2	149347.8	Chromium hexavalent, chromium total[a], lead, anions[b], GEA, strontium-90, asbestos

Table 2. 100-N South River Road Verification Focused Sample Summary (2 Pages)

Sample Number	HIES Number	Waste Site(s)	Easting	Northing	Contaminants of Potential Concern
RR-8	TBD	100-N-84:6	570993.4	149315.2	Chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
RR-8-Duplicate[c]	TBD	100-N-84:6	570993.4	149315.2	Chromium total[a], lead, anions[b], GEA, strontium-90, asbestos
Equipment Blank[e]	TBD	NA	NA	NA	ICP metals[a], mercury

[a] Sample analysis for ICP metals will include antimony, arsenic, barium, beryllium, boron, cadmium, chromium (total), cobalt, copper, lead, manganese, molybdenum, nickel, silver, selenium, vanadium, and zinc.

[b] Analysis will be performed for the expanded list of ion chromatography anions to include bromide, chloride, fluoride, nitrate, nitrite, phosphate, and sulfate. To preclude holding time issues associated with EPA Method 300.0 for nitrites and nitrates, EPA Method 353.2 will be performed.

[c] A field duplicate samples will be collected from at least one sample location for each waste site. The duplicate sample locations will be at the discretion of the project analytical lead unless otherwise identified.

[d] 100-N-76 is classified as a "rejected/Not Accepted" and does not have an COPCs associated with it. 100-N-76 is listed in table for completeness.

[e] Multiple equipment blanks may be collected. An equipment blank will be collected for each day sampling is performed.

EPA = U.S. Environmental Protection Agency
GEA = gamma energy analysis
HEIS = Hanford Environmental Information System
ICP = inductively coupled plasma
NA = not applicable
PCB = polychlorinated biphenyl
PAH = polycyclic aromatic hydrocarbons
SVOC = semivolatile organic compound
TBD = to be determined
TPH = total petroleum hydrocarbons

4.5.1 Sample Collection

Figures 2 and 3 show the location of the verification focused samples. The verification focused sample locations will be surveyed and marked/staked prior to sample collection using the coordinate pairs provided in Table 2. A discrete soil sample will be collected at each designated sample point at 0 to 0.15 m (0 to 6 in.) below the surface of the exposed excavated soil and analyzed using the methods identified in Table 1.

All verification focused samples will be analyzed using the methods identified in Table 1. Full protocol laboratory analysis will be requested for all samples.

4.5.2 Verification Sample Collection – Quality Control/Quality Assurance

One equipment blank sample consisting of clean silica sand poured over the sampling equipment will be collected and analyzed as indicated in Table 2. Field duplicate verification focused samples will be collected at locations identified in Table 2. The duplicate sample will be analyzed for the full suite of analytes using the same methods specified for the corresponding primary sample in Table 2.

Field quality control samples will be collected as required in the 100-N Area SAP (DOE-RL 2006a). Any deviations from the planned quality control sampling shall be documented in the field logbook and discussed in the data quality analysis attached to the RSVP.

4.6 DATA QUALITY ASSESSMENT

All samples will be requested for a full protocol laboratory analysis. Post-data collection activities will generally follow those outlined in *Statistical Guidance for Ecology Site Managers* (Ecology 1992) and the U.S. Environmental Protection Agency's *Data Quality Assessment: A Reviewer's Guide* (EPA 2006). The data analyst will be familiar with the context of the site remedial action objectives and goals for data collection and assessment. The data will be verified and validated in accordance with site-specific data quality objectives found in the 100-N Area SAP (DOE-RL 2006a). Graphical and analytical tools will be used to verify, to the extent possible, the assumptions of the statistical analyses that were performed, as well as to achieve a general understanding of the verification sampling data. The data will be used to assess whether the sample results are adequate, in both quality and quantity, to support the primary objective of demonstrating that the site meets the cleanup criteria specified in the RDR/RAWP (DOE-RL 2006b) and the 100-N ROD (EPA 1999).

Figure 2. Verification Focused Sample Locations within the 100-N South River Road Boundary Map 1 of 2.

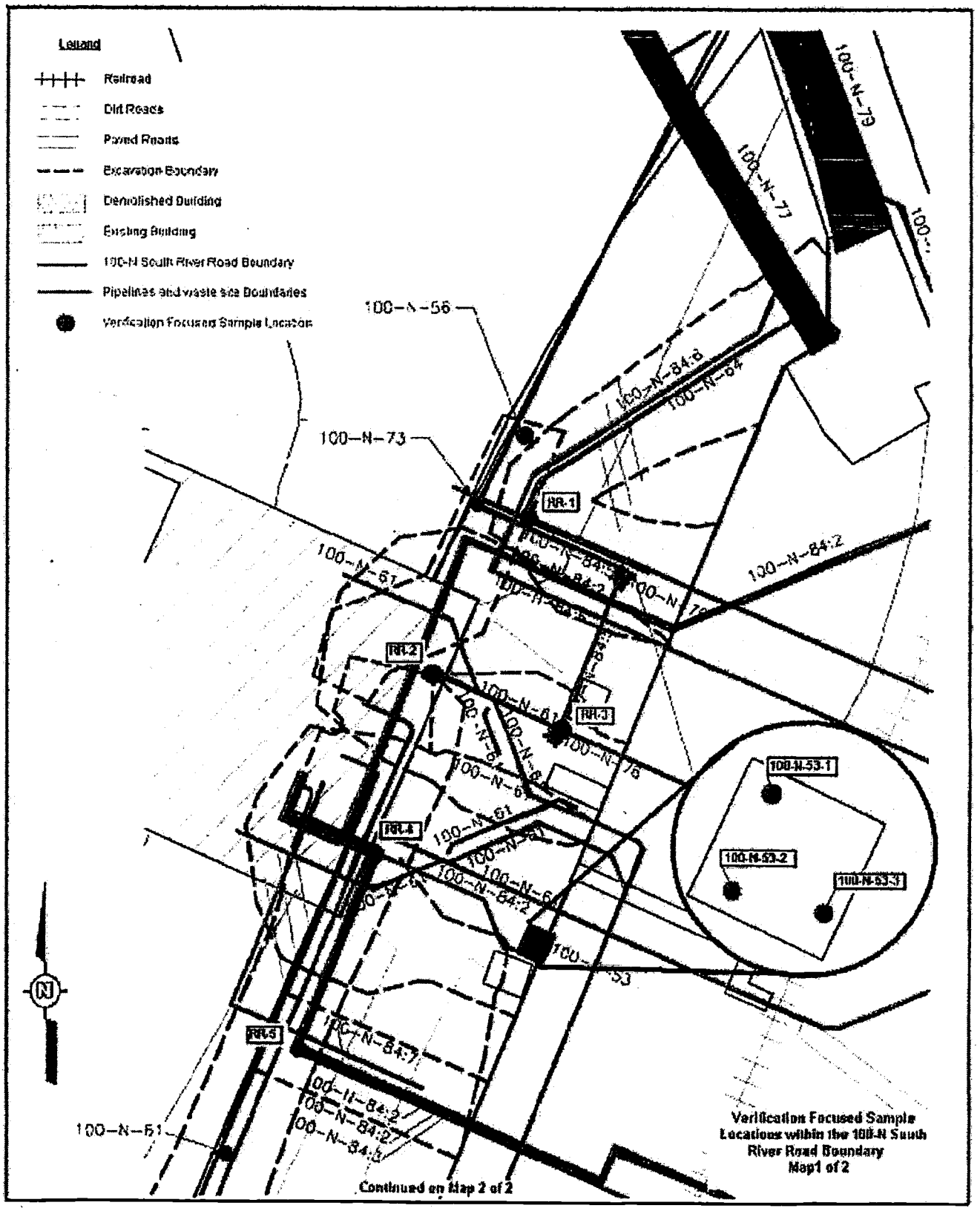
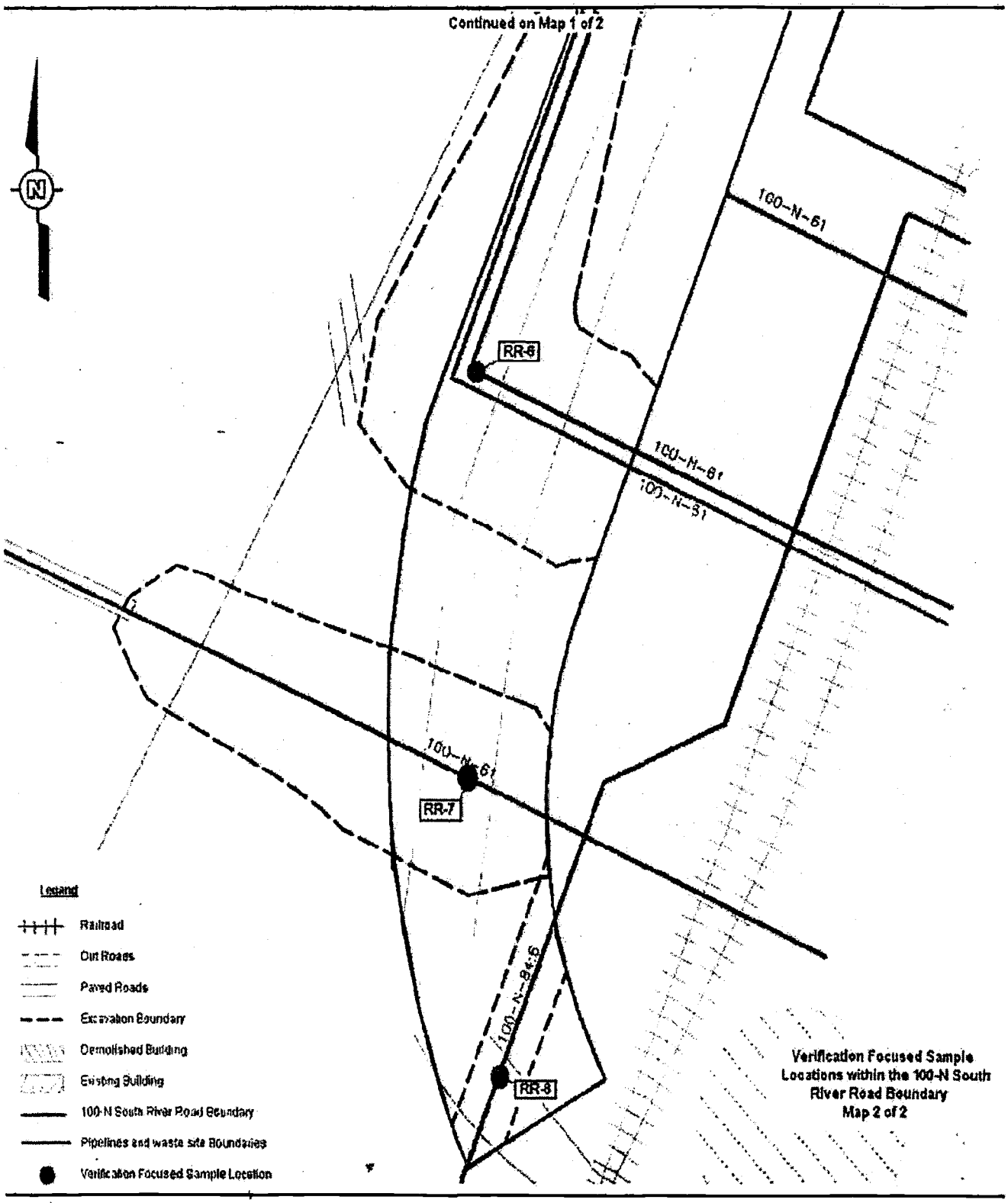


Figure 3. Verification Focused Sample Locations within the 100-N South River Road Boundary Map 2 of 2.



5.0 REFERENCES

DOE-RL, 2006a, *100-N Area Sampling and Analysis Plan for CERCLA Waste Sites,* DOE/RL-2005-92, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, 1992, *Statistical Guidance for Ecology Site Managers*, Publication No. 92-54, Washington State Department of Ecology, Olympia, Washington.

ENV-1, *Environmental Monitoring & Management,* Washington Closure Hanford, Richland, Washington.

EPA, 1999, *Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington,* U. S. Environmental Protection Agency, Region 10, Seattle, Washington.

EPA, 2006, *Data Quality Assessment: A Reviewer's Guide*, EPA QA/G-9R, EPA/240/B-06/002, U.S. Environmental Protection Agency, Office of Environmental Information, Washington, D.C.

WCH, 2011, "100-N-53, 181-N Building Waste Oil Tank for Remedial Action," CCN 157966 to S. W. Callison from M. L. Proctor, Washington Closure Hanford, Richland Washington, April 20.

APPENDIX A
WASTE INFORMATION DATA SYSTEM
GENERAL SUMMARY REPORT

AND

STEWARDSHIP INFORMATION SYSTEM
SITE SUMMARY REPORT

Waste Information Data System
General Summary Report

04/26/2011

Site Code: 100-N-53 | Site Reclassification Status: None | Page 1

Site Names: 100-N-53; 181-N Building Waste Oil Tank

Site Type: Storage Tank
Status: Inactive
Hanford Area: 100N
OU/WMA: 100-NR-1

Start Date:
End Date:
Pipe Type: Not Specified

Site Description: The site was an empty above-ground waste oil tank. The tank is 1.1 meters (3.5 feet) in diameter and 1.2 meters (4.1 feet) high. A site visit in July 1999 found that the tank has been removed.

Location Description: The site is located in the 100-N Area, 18 meters (60 feet) east of the 181-N Pumphouse.

Process Description: The site received waste oil from diesel powered emergency pumps in the 181-N Building.

Associated Structures: The 181-N Building is associated with this site.

References: 1. CR Webb, 01/02/1997 Field Logbook assigned to Christine Webb, EL-1255 and EL-1255-1.

Waste Information:

Type: Oil
Category: Hazardous/Dangerous
Physical State: Liquid
Waste Obscured: None
Description: The tank has been removed.

Amount:
Units: Not Specified
Reported Date:

Dimensions:

Depth/Height:	1.25 Meters	4.10 Feet
Diameter:	1.07 Meters	3.50 Feet
Site Shape:	Circle	

References: 1. TF Johnson, 04/28/1995 Suspect Waste Site Investigation Logbook, EL-1238.

Field Work:

Type: Site Walkdown
Begin Date: 07/07/1999
End Date: 07/07/1999
Purpose: RARA Walkdown

Type: Site Walkdown
Begin Date: 03/07/1996
End Date: 03/07/1996
Purpose: Initial Review
References: 1. TF Johnson, 04/28/1995 Suspect Waste Site Investigation Logbook, EL-1238.

Type: Site Walkdown
Begin Date: 07/07/1999
End Date: 07/07/1999

Site Code: 100-N-53 Site Reclassification Status: None Page 2

Purpose:	RARA Walkdown
Comment:	The Waste Oil tank has been removed. Only the foundation remains.
References:	1. CR Webb, 01/02/1997 Field Logbook assigned to Christine Webb, EL-1255 and EL-1255-1.

Programmatic Responsibility

DOE Program: Confirmed By Program:

DOE Division:

Responsible Contractor/Subcontractor:

Reclassifying Contractor/Subcontractor:

Responsible Project:

Site Evaluation

Solid Waste Management Unit:

TPA Waste Management Unit Type:

Permitting

RCRA Part B Permit: TSD Number:

RCRA Part A Permit: Closure Plan:

RCRA Permit Status:

Septic Permit: 216/218 Permit:

Inert LandFill: NPDES:

Air Operating Permit: State Waste Discharge Permit:

Air Operating Permit Number(s):

Tri-City Agreement

Lead Regulatory Agency:

Unit Category:

TPA Appendix:

Remediation and Closure

Decision Document:

Decision Document Status:

Remediation Design Group:

Closure Document:

Closure Type:

WAC 173-340 (2007) Cleanup Comparison by Ecology:

Post Closure Requirments: Residual Waste:

New Site Code:

Images:

Pathname: //mapweb.ri.gov/vids/mof/100n/3773/3773_01.jpg Date Taken:

Description:

Site Code: 100-N-53	Site Reclassification Status: None	Page 3

Pathname:	//mapweb.rl.gov/widsimg/100n/3773/3773_02.jpg	Date Taken: 07/08/1999
Description:	Photo shows the waste oil tank foundation. The tank has been removed.	

Site Code: 100-N-61	Site Reclassification Status: None	Page 4

Site Names: 100-N-61; 100-N Water Treatment and Storage Facilities Underground Pipelines

Site Type:	Process Sewer	**Start Date:**	January 01, 1963
Status:	Inactive	**End Date:**	January 01, 1987
Hanford Area:	100N	**Pipe Type:**	Not Specified
OU/WMA:	100-NR-1		

Site Description: The site encompasses all underground water pipelines used to transport reactor cooling water between water treatment facilities and the 105-N Reactor Building. These include all underground lines running between buildings and those that run to drainage facilities. Pipelines within buildings and all pipelines that are downstream from the reactor building, i.e., those lines that carry cooling water from the reactor to effluent disposal facilities such as the dump tank and cribs are excluded.

Location Description: The site is located where the underground pipelines run from the 181-N River Pump House to the 163-N Water Treatment Plant, the 182-N Pump House and Storage Tanks, and to the 105-N Reactor Building. Also, any underground drainage pipelines running from the water treatment and storage facilities to the riverside outfall structures. Other underground pipelines running to the outfall structures are included in other waste sites and are therefore excluded from this site.

Process Description: Reactor cooling water was pumped from the Columbia River, settled and treated to remove minerals, then injected into the reactor primary coolant loop at a rate of about 760 liters/minute--(200 gallons/minute).

Associated Structures: Associated structures include the 181-N River Pump House, the 182-N Pump House, the 163-N Water Treatment Plant, and the 105-N Reactor Building.

Site Comment: The 100-N-61 waste site pipelines are located through out the 100-N Area and are collocated with a number of other pipeline waste sites including but not limited to the 100-N-84, 100-N Miscellaneous Pipelines waste site. During remediation of the 100-N-61 waste site collocated waste sites may be partially or fully remediated.

A 7.6-cm (3-in.) french drain located 2.8 m (9.2 ft) to the east of the 1902-H building wall and the location of a french drain with a 1.9-cm (0.75-in.) clean medium-pressure steam return line from the 108-N building (removed during the demolition of the 108-N building), both part of the 100-N-103 waste site, fall within the planned excavation footprint for 100-N-61. As a consequence these features will be dispositioned during WCH remediation of the 100-N-61 waste site.

References: 1. DH Deford, 10/31/1996 From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100-N Water T

Waste Information:

Type:	Water	**Amount:**	
Category:	Nondangerous/nonradioactive	**Units:**	Not Specified
Physical State:	Solid and Liquid	**Reported Date:**	
Start Date:	01/01/1963	**End Date:**	01/01/1987
Waste Obscured:	Soil Overburden		
Description:	The waste is steel piping, concrete, and soil (if contaminants are present). Chemical additives to the reactor cooling water included sulfuric acid, sodium hydroxide, aluminum sulfate (alum) with excess hydrated calcium oxide, separan, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, and the free chlorine residual was approximately 0.2 milligrams/liter.		
References:	1. S. L. Cote', 100-N Area Technical Baseline Report, WHC-SD-EN-TI-251.		

Site Code: 100-N-61 Site Reclassification Status: None Page 5

Unplanned Release:

Release Name: 100-N-7
Reported Date: Occurance Report #:
Begin Date:
End Date:
Description: 100-N-7 was an unplanned release that occurred in underground discharge pipelines associated with this site.
References: 1. DH Deford, 10/31/1996 From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100-N Water Treatment Facility Underground Water Pipelines, FDO:10-31-96.

Programmatic Responsibility

DOE Program: Confirmed By Program:
DOE Division:
Responsible Contractor/Subcontractor:
Reclassifying Contractor/Subcontractor:
Responsible Project:

Site Evaluation

Solid Waste Management Unit:
TPA Waste Management Unit Type:

Permitting

RCRA Part B Permit: TSD Number:
RCRA Part A Permit: Closure Plan:
RCRA Permit Status:
Septic Permit: 216/218 Permit:
Inert LandFill: NPDES:
State Waste
Air Operating Permit: Discharge Permit:
Air Operating Permit Number(s):

Tri-City Agreement

Lead Regulatory Agency:
Unit Category:
TPA Appendix:

Remediation and Closure

Decision Document:
Decision Document Status:
Remediation Design Group:
Closure Document:
Closure Type:
WAC 173-340 (2007) Cleanup Comparison by Ecology:
Post Closure Requirments: Residual Waste:
New Site Code:

Site Code: 100-N-64	Site Reclassification Status: None	Page 6

Site Names:	100-N-64; 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines		
Site Type:	Radioactive Process Sewer	Start Date:	January 01, 1983
Status:	Inactive	End Date:	January 01, 1987
Hanford Area:	100N	Pipe Type:	Not Specified
OU/WMA:	100-NR-1		

Site Description: This site includes those underground pipelines that transported reactor cooling water from the 105-N Reactor facilities to the 116-N-4 (1300-N), the 1304-N Emergency Dump Basin and Tank respectively, the 107-N Filter Building and the pipelines from these facilities to the 1908-N Outfall Structure. It does not include the underground lines that discharge to the 1301-N (116-N-1) and/or 1325-N (116-N-3) Cribs that are addressed by a separate Waste Information Data System (WIDS) entry for the 105-N Reactor, 1314-N, 116-N-1, and 116-N-3 underground pipelines (site 100-N-63).

Generally these lines leave the 105-N Reactor Building on the west side and proceed to the west to their respective treatment/disposal facilities. The 107-N Building includes return pipelines as well as other process pipelines contained in a concrete encasement between the 105-N and 107-N Buildings. This encasement houses 0.26-meter (10-inch) and 0.46-meter (18-inch) demineralized water lines, a 0.3-meter (12-inch) filtered water line, 1.3-centimeter (0.5-inch) instrument air, 5.1-centimeter (2-inch) steam, 15-centimeter (6-inch) fire, line and telephone, instrument, power, and fire alarm lines. The encasement is about 30 meters (98 feet) long. The remaining underground pipelines associated with the 1300-N and 1304-N include a 0.76-meter (30-inch) flush line, a 0.61-meter (24-inch) vent, a 0.76-meter (30-inch) overflow, a 25.4-centimeter (10-inch) blowdown, and a connection to the 25.4-centimeter (10-inch) radioactive drain line that becomes the 0.3-meter (12-inch) radioactive drain line not included with this waste site. The site does include overflow lines to the 1908-N Outfall Structure, but does not include the 1908-N Outfall Structure itself.

Location Description: This site is the location of underground pipelines running between the 105/109-N Buildings to the 116-N-4 (1300-N), the 1304-N Emergency Dump Basin and Tank, the 107-N Filter Building to the 1908-N Outfall Structure.

Process Description: The Emergency Dump Basin (116-N-4/1300-N) and the Emergency Dump Tank (1304-N) were designed to receive "single-pass" reactor cooling water in the case of an emergency. Both systems were used to periodically receive steam blowdown. The 1304-N Tank replaced the 1300-N Basin. This steam condensate normally contained low levels of radionuclide contamination and fission products. Overflow and drain lines to the 1908-N Outfall Structure are include in this waste site. However, the outfall structure is a separate waste site.

Associated Structures: The associated structures are the 105-N and 109-N Reactor Buildings. The TSD pipelines are in site 100-N-63.

References: 1. S. L. Cote', 100-N Area Technical Baseline Report, WHC-SD-EN-TI-251.

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Radioactive	Units:	Not Specified
Physical State:	Solid and Liquid	Reported Date:	
Start Date:	01/01/1963	End Date:	01/01/1987
Waste Obscured:	Soil Overburden		

Description: The waste is the contaminated underground pipelines. The following radionuclides were released from the reactor through the underground pipelines to the 116-N-4 (1300-N), 1304-N Emergency Dump Basin and Tank, the 107-N Filter Building and to the 1908-N Outfall Structure. Residual contaminants of some may be expected to remain in the underground pipelines. These include: sodium-24, niobium-95, iodine-131, chromium-51, zirconium-95, tellurium-132, technetium-99, manganese-54, iron-59, ruthenium-103, cerium-144, and cobalt-60. Because of radioactive decay, only manganese-54, cobalt-60, and cerium-144 are expected to remain.

Site Code: 100-N-64 | Site Reclassification Status: None | Page 7

Programmatic Responsibility

DOE Program:

Confirmed By Program:

DOE Division:

Responsible Contractor/Subcontractor:

Reclassifying Contractor/Subcontractor:

Responsible Project:

Site Evaluation

Solid Waste Management Unit:

TPA Waste Management Unit Type:

Permitting

RCRA Part B Permit:

TSD Number:

RCRA Part A Permit:

Closure Plan:

RCRA Permit Status:

Septic Permit:

216/218 Permit:

Inert LandFill:

NPDES:

Air Operating Permit:

State Waste Discharge Permit:

Air Operating Permit Number(s):

Tri-City Agreement

Lead Regulatory Agency:

Unit Category:

TPA Appendix:

Remediation and Closure

Decision Document:

Decision Document Status:

Remediation Design Group:

Closure Document:

Closure Type:

WAC 173-340 (2007) Cleanup Comparison by Ecology:

Post Closure Requirments:

Residual Waste:

New Site Code:

Site Code: 100-N-84	Site Reclassification Status: None	Page 8

Site Names:	100-N-84; 100-N 100-N Miscellaneous Pipelines		
Site Type:	Radioactive Process Sewer	Start Date:	
Status:	Inactive	End Date:	
Hanford Area:	100N	Pipe Type:	Not Specified
OU/WMA:	100-NR-1		

Site Description: This site consists of all miscellaneous pipelines in the 100-N Area that were identified during the Orphan Site Evaluation (OSE) process and not previously tied to an existing waste site. The site includes product pipelines, service water pipelines, sewers and associated features (manholes, storm drains, valve boxes, etc.). Helium lines, electrical conduit, telephone lines, electrical grounding lines (ground), control air supply, fire alarm systems were excluded from the site.

The miscellaneous pipelines supported the reactor operation and related support facilities throughout the N-Area. The process description is provided for each of the subsites in their respective writeups.

Location Description: The pipeline segments within the 100-N Area.

Site Comment: The pipelines are generally encased in horizontal pipe trays. In many cases the utility lines are co-located within the concrete encasements. No evaluation has been conducted to determine if the co-located utility lines (electrical, telephone, instrumentation, etc) are active.

References:
1. 06/01/2009 100-N Area Orphan Sites Evaluation Report, Rev. A, WCH OSR-2009-0001.

SubSites:

SubSite Code:	100-N-84:1
SubSite Names:	100-N-84:1; 100-N Area Raw Water Pipelines
Classification:	Accepted
ReClassification:	None

Site Code: 100-N-84 Site Reclassification Status: None Page 9

Description:	The subsite consists of the 100-N Area raw water pipelines includes: low pressure water, raw water, raw water return, raw water supply, raw water supply high and low pressure, emergency The lines are raw water supply, sprinkler, vent, fire line, irrigation, fog, and fish line pipelines, located throughout the 100-N Area's 100-NR-1 operable unit. The large majority of the pipelines being located in and around the 182-N High-Lift Pump House, 163 Demineralization Plan, 183-N Water Filter Plant, 184-N Power House, the 185-N Hanford Generating Plant, 109-N Heat Exchanger Building and a scattering of office buildings and trailers located to the south and south east of the 105-N Reactor Building. One additional 12-in raw water line used for temporary construction is located to in the north eastern portion of the 100-N area and connects to the export water pipeline. The 100-N Area raw water system was built in 1963 with additional portions added as new support buildings were constructed. Raw water was pumped from the Columbia River at the 181-N Pump House to the 185-N Hanford Generating Plant, the 109-N Heat Exchanger Building, the 182-N High-Lift Pump House, and the 184-N Power House. These large delivery pipelines are not part of the 100-N-84 waste site. The subsite includes pipelines between the 105-N Reactor Building and it's supporting facilities. The pipelines exiting the 182-N Building transferred raw water to the 105-N, 109-N, 163-N and 183-N Buildings. At the 182-N Building raw water was passed through screens before it was stored in 18.6 m (61 ft) deep independent pump suction wells for future distribution. Raw water supplied to the 109-N Heat Exchange Buildings supported the dump-condensers, graphite cooling heat exchangers turbines surface-condensers. Additionally raw water was supplied to the 182-N Building emergency raw water tank and various heat exchangers, along with the 100-N Area irrigation and fire systems. The fire system pipelines originating at the 182-N supported the 185-N Hanford Generating Plant and substation located to the south of the 105-N reactor Building and outside of the 100-N Fenced area. Raw water from the 109-N and 184-N buildings could also be returned to the Columbia river through the Seatwell. The pipelines located between the 109-N, 182-N, 163-N and the 183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-89933). This area was excavated and backfilled in 2008 through 2009. Raw water lines collocated with 105-N Reactor Treatment Storage and Disposal Underground Pipelines along the east side of the 109-N and 105-N Buildings lay within the 100-N-63 excavation footprint (H-1-89933). This area was excavated and backfilled in 2009 through 2009.
References:	1. 03/23/2010 10-N-63 Effluent Pipelines Overall Plot Plan, H-1-89933, Rev 1.

SubSite Code:	100-N-84:2
SubSite Names:	100-N-84:2; 100-N Area Fuel and Foam Pipelines
Classification:	Accepted
ReClassification:	None
Description:	The subsite includes the fuel oil and foam underground pipelines in the 100-N Area, located to the north west and west side of the 105-N Reactor Building. Two fuel oil unloading, storage and transfer systems were used in the 100-N Area. Diesel oil unloaded from rail cars at the 166-N unloading station was transferred for storage to the one of four aboveground storage tanks within the 1715-N Building. The diesel oil was then transferred through a 10.2 cm (4-in) underground supply pipeline to the 184-N Building day tank or through 5.1 cm (2-in) and 10.2 cm (4-in) underground pipelines to the three 56,781 L (15,000 gal) day tanks outside of the 182-N building. The diesel fuel from the 182-N day tanks was used to support the 182-N and 181-N diesel oil systems. Number 6 fuel oil (also known as Bunker C fuel oil) was unloaded from rail cars at the 1900-N unloading station and transferred to the 166-N Building for storage in a 5,204,941 L (1,375,000 gal) capacity aboveground storage tank. The No. 6 fuel oil was transferred through underground pipelines from 166-N to two 184-N fuel oil day tanks. Foam fire suppression lines to support the diesel oil tanks and pipelines are collocated with the diesel oil pipelines near the 166-N Building. The north west portions of the 100-N-84:2 pipelines are located within the 100-N-63 excavation footprint.(H-1-89933).
References:	1. 03/23/2010 10-N-63 Effluent Pipelines Overall Plot Plan, H-1-89933, Rev 1.

SubSite Code:	100-N-84:3
SubSite Names:	100-N-84:3; 100-N Area Filter and Potable Water Pipelines
Classification:	Accepted
ReClassification:	None

Site Code: 100-N-84	Site Reclassification Status: None	Page 10

Description:	Site Description: The 100-N Area filter and potable water pipelines includes: makeup water, filter water, demineralized water, and potable water pipelines, as supplied to 183-N Filter Plant Building for pretreatment and filtration. The 183-N filter plant supplied sanitary water to the entire 100-N Area. The plant also supplied filtered water to various buildings throughout the 100 N Area for use where treated water was not desirable or required. The term "treated water herein refers to filtered water that had liquid alum (aluminum sulphate), separan (polyacrylamide) and liquid chlorine added during pretreatment. Demineralized water from 183-N Building was used as makeup water feed for the pretreatment system in 183-N building, while raw water was used for chemical mixing in the 182-N and 183-N Buildings prior to being added to the water. The chemical feed systems were maintained using proportional ratios with the water flow. Demineralized water was used to prevent mineral deposits what would foul pipeline systems. Chlorine was added for the control of slime and algae, and may have been used to assist in coagulation, odor and iron removal problems. Alum was used as the principle coagulant during pretreatment. 100-N-84:3 pipelines located between the 109-N, 182-N, 183-N and the 183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-39932). This area was excavated and backfilled in 2008 through 2009. The north west portions of the 100-N-84:3 pipelines are located within the 100-N-63 excavation footprint (H-1-89933). Filtered water lines are located to the north and south of the 105-N reactor Building, while the potable water lines are located mainly to the southwest of the 105 reactor building to the 105-N support facilities.
References:	

SubSite Code:	100-N-84:4
SubSite Names:	100-N-84:4; 100-N Area Steam and Condensate Pipelines
Classification:	Accepted
ReClassification:	None
Description:	Site Description: The 100-N Area steam and condensate pipelines includes: steam, condensate, and injection and vacuum pump water. Process Description: The N Reactor stream was used to generate electricity from 1966 to January 7, 1987. Condensate from the dump condensers was routed back to steam generators for regeneration. The main steam system was designed to distribute steam generated from generators on the roof of the 109-N Building as high, medium and low pressure steam. High pressures steam was exported through a 71 cm (28-in) pipeline to the 184-N Building to support the turbine generator and miscellaneous services. Medium pressure steam was distributed from 109-N for area heating (105-N, 182-N, 183-N, 183-N, 108-N, 1704-N, 1716-N, and 1734-N) and additional miscellaneous services. Low pressure steam was exported to the 184-N and 153-N Buildings for unit heaters and convectors. Stand-by boilers located 184-N were maintained independent of reactor operation supplying steam to the 184-N day tanks, the 166-N fuel unloading facilities and for the 109-N emergency seal water turbines. Once the steam had been utilized in each building condensate return pipelines exported the 184-N Building condenser receiver where it is recirculated deaerating heater for reuse. 109-N Building was equipped with a condensate diversion station controlling the levels in the deaerated water storage tank. A 10" condensate emergency drain could be used to release condensate from 109N to the 0.17 m (66-in) raw water pipelines downstream of the Seahwell. 100-N-84:3 pipelines located between the 109-N, 182-N, 183-N and the183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-89932). This area was excavated and backfilled in 2008 through 2009. Location Description: The steam and condensate pipelines are concentrated around the 105-N Reactor building to support facilities and the 185-N Hanford Generating Plant. Site Comment: The following three dry wells and their associated pipelines for the 100-N-103 waste site fall within the planned excavation footprint for the 100-N-84:4 waste site: A 1.2-m (48-in.) dry well with a 10-cm (4-in.) floor drain from an equipment access pit, and a 10-cm (4-in.) cast iron floor drain line from a clean office area at the 105-N Building. A dry well with a 10-cm (4-in.) steam condensate pipeline from the 105-N Building and another 10-cm (4-in.) steam condensate pipeline from clean operations in 1712-N. A dry well with a 7.6-cm (3-in.) low-pressure steam condensate pipeline from the 1734-N Gas Bottle Storage Building. As a consequence these features will be dispositioned during remediation of the 100-N-84:4 waste site.
References:	1. Habel, Len, 01/11/2011 WCH request adding text to site 100-N-84:4 reflecting that 3 dry wells and pipelines are associated with 100-N-103 for excavation purposes, 100-N-84.

SubSite Code:	100-N-84:5
SubSite Names:	100-N-84:5; 100-N Area Sanitary
Classification:	Accepted
ReClassification:	None

Description:	Site Description: The 100-N Area sanitary pipelines includes: sanitary water and sewer, storm drains, and disposal field pipelines. ProcessDescription: The 100-N Area was serviced by ten separate sewer systems consisting of one cesspool, one lagoon, one septic tank with an associated tile field, two septic tanks with seepage pits, and five septic tanks associated with drain fields. The septic tanks, pits, cesspools and lagoon are identified as the 124-N-1 through 124-N-10 waste sites. Waste sites 124-N-5, 124-N-6, 124-N-7, 124-N-8 have been reclassified as "rejected". The feed and drainage pipelines associated with these waste sites are included in 100-N-84:5. LocationDescription: The 100-N-84:5 pipelines are located throughout the 100-N Area's 100-NR-1 operable unit.
References:	

SubSite Code:	100-N-84:6
SubSite Names:	100-N-84:6; 100-N Area Chemical and Process Sewer Pipelines
Classification:	Accepted
ReClassification:	None
Description:	Site Description: 100-N Area Chemical and Process Sewer Pipelines include: Chemical waste, DMV waste, drain cold, dummy disposal line, Miscellaneous chemical drain, radioactive drain, chlorine, flush, and sample pipelines. ProcessDescription: The 100-N-84:6 pipelines originate from the 109-N Heat Exchanger Building, the 105-N Reactor Building, the 163-N Demineralization Plant, 182-N High-Lift Pump House, 183-N Filter Plant, and 184-N Power House. Various chemicals were utilized in these buildings. Phosphoric, ascorbic and citric acids, and potassium permanganate were used in the 109-N and 105-N Buildings decontamination processes (WHC-SP-0460). Ammonium hydroxide, morpholine and lithium hydroxide were added to control cooling water pH. Hydrazine was added to reduce oxygen concentrations in cooling water (WHC-SP-0460). The addition of these chemicals and the core's cooling water system design allowed the water to recycled instead of using raw water as a once through coolant (DOE/RL-90-22) Sulfuric acid and sodium hydroxide from supply tanks in 163-N Building were primarily consumed in the demineralizer plant. A 93% sulfuric acid solution was used to regenerate the cation resin used at the 163-N Building while a 50% sodium hydroxide solution was use to regenerate the anion resin. The 8-in acid drain from 183-N connected into the 100N river channel discharge line to the Columbia River. Sodium sulfite was used as a deoxygenizing chemical for low pressure filter water (182-N). Sodium dichromate was added to filtered water supply and raw water supply for cooling coils in the 105-N Reactor Building. Radioactive drains at 109-N collect from the coolant systems, hot water quality laboratory, service bay hot shop. The 105-N and 109-N drains run to the 1301-N Liquid Waste Disposal Crib. 100-N-84:6 pipelines located between the 109-N, 182-N, 163-N and the183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-89932). This area was excavated and backfilled in 2008 through 2009. A small portion of the 100-N-84:6 pipelines also lay within the adjacent 100-N-64 planned excavation (H-1-89934). LocationDescription: The 100-N-84:6 waste site pipelines are centrally located between the 100-N Area process buildings (105-N, 109-N, 182-N, 183-N, 184-N, and 163-N).
References:	

SubSite Code:	100-N-84:7
SubSite Names:	100-N-84:7; 100-N Area Unidentified and Other Miscellaneous Pipelines
Classification:	Accepted
ReClassification:	None
Description:	The 100-N-84:7 waste site pipelines include sections of various diameter pipelines located within the 100-NR-1 operable unit in and around the 105-N Reactor Building. These sections described as unidenitifed or multitube could not be positively identified based on review of historical documentation. An above ground feature, labeled N-213, was observed during the 100-N Orphan Site Evaluation (OSR-2009-0001). Being co-located with the 100-N-84 pipelines it was decided to incorporate this feature into this subsite.
References:	

SubSite Code:	100-N-84:8
SubSite Names:	100-N-84:8; 100-N Area Unidentified Pipelines within Planned Excavations
Classification:	Accepted
ReClassification:	None

Description:	The 100-N-84:8 waste site pipelines include sections of various diameter pipelines located within the 100-NR-1 operable unit in and around the 105-N Reactor Building. These sections described as unidentified or multitube could not be positively identified based on review of historical documentation. Most are believed to be less than 4m (13 ft) long or are within the planned remedial action excavation area which will result in removal of the pipeline section. Two of the pipeline sections included in the 100-N-84:8 waste site are longer than 4m (13 ft). However these pipeline sections lay completely with the planned remediation excavation of the UPR-100-N-21 and UPR-100-N-23 waste sites (H-1-89916), and 100-N-22 waste site (H-1-89924). An above ground feature, labeled N-218, was observed during the 100-N Orphan Site Evaluation (OSR-2009-0001) to be co-located with the 100-N-84 pipelines. As a consequence this feature was dispositioned as part of 100-N-84.
References:	1. 06/01/2009 100-N Area Orphan Sites Evaluation Report, Rev. A, WCH OSR-2009-0001. 2. 03/23/2010 100 N Area - 100 N Waste Site Remediation Design - 100-N-22 Sanitary Sewer System Civil Plot Plan Washington Closure H, H-1-89924, Rev 1. 3. 03/23/2010 100 N Area - 100 N Waste Site Remediation Design - UPR-100-N-42, 19, 21, 22 and 23 Civil Plot Plan Washington Closure Hanford, LLC, H-1-89916, Rev 1.

SubSite Code:	100-N-84:9
SubSite Names:	100-N-84:9; 100-N Area Active Raw Water Pipelines
Classification:	Accepted
ReClassification:	None
Description:	The 100-N Area active raw water pipelines range in size from 6 to 12 inches in diameter and are used for fire protection. The 100-N, 12 inch export water line is fed from the main 42 inch raw water export line between 100-B and 100-D Areas. Smaller pipeline segments connect this line to various fire hydrants located in the 100-N industrial area. Process Description: Raw water was pumped from the Columbia River and supplied to the fire protection pipelines. Location Description: The 100-N-84:9 pipelines are located east of the 105-N Building.
References:	

Programmatic Responsibility

DOE Program:	Confirmed By Program:
DOE Division:	
Responsible Contractor/Subcontractor:	
Reclassifying Contractor/Subcontractor:	
Responsible Project:	

Site Evaluation

Solid Waste Management Unit:	
TPA Waste Management Unit Type:	

Permitting

RCRA Part B Permit:	TSD Number:
RCRA Part A Permit:	Closure Plan:
RCRA Permit Status:	
Septic Permit:	216/218 Permit:
Inert LandFill:	NPDES:
Air Operating Permit:	State Waste Discharge Permit:
Air Operating Permit Number(s):	

Tri-City Agreement

Lead Regulatory Agency:	
Unit Category:	

Site Code: 100-N-84 Site Reclassification Status: None Page 13

TPA Appendix:

Remediation and Closure

Decision Document:

Decision Document Status:

Remediation Design Group:

Closure Document:

Closure Type:

WAC 173-340 (2007) Cleanup Comparison by Ecology:

Post Closure Requirments: Residual Waste:

New Site Code:

The Following Site(s) Where Consolidated With This Site:

Site Names: 100-N-84:2; 100-N Area Fuel and Foam Pipelines
Reason:

Site Names: 100-N-84:3; 100-N Area Filter and Potable Water Pipelines
Reason:

Site Names: 100-N-84:4; 100-N Area Steam and Condensate Pipelines
Reason:

Site Names: 100-N-84:1; 100-N Area Raw Water Pipelines
Reason:

Site Names: 100-N-84:5; 100-N Area Sanitary
Reason:

Site Names: 100-N-84:9; 100-N Area Active Raw Water Pipelines
Reason:

Site Names: 100-N-84:6; 100-N Area Chemical and Process Sewer Pipelines
Reason:

Site Names: 100-N-84:7; 100-N Area Unidentified and Other Miscellaneous Pipelines
Reason:

Site Names: 100-N-84:8; 100-N Area Unidentified Pipelines within Planned Excavations
Reason:

RCC Stewardship Information System

Site Summary Report

04/27/2011

Site Code: 100-N-53 | Site Classification Status: Accepted | Page 2

Dimensions:

Length:	Width:	Depth/ Height:	Overburden Depth:	Diameter (Large):	Diameter (Small):	Wall Thickness:	Sq. Area:	Est. Volume:	Capacity:
		1.25 m (4.10 ft)		1.07 m (3.50 ft)					

Site Shape: Circle

References: 1. EL-1238, 04/28/1995, Suspect Waste Site Investigation Logbook, Bechtel Hanford Inc.

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit: No

RCRA Part B Permit: No

Closure Plan:

RCRA Closure Type:

Residual Waste: No

Other Permitting:

2126/218 Permit: No

NPDES: No

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH, Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. 0100N-WI-G0002, 04/14/2008, Work Instruction for Confirmatory Sampling of the 100-N-53, 181-N Building Waste Oil Tank, Washington Closure Hanford, LLC
2. EL-1238, 04/28/1995, Suspect Waste Site Investigation Logbook, Bechtel Hanford Inc.
3. EL-1255, 01/02/1997, Field Logbook assigned to Christine Webb, Bechtel Hanford Inc.
4. EL-1255-1, 08/07/1999, ER Site Investigations - Field Logbook assigned to Christine Webb, Bechtel Hanford Inc.
5. H-1-45007, Sheet 23, 07/06/1989, COMPOSITE UNDERGROUND LINES, Rev. 4, United Nuclear Industries

RCC Stewardship Information System

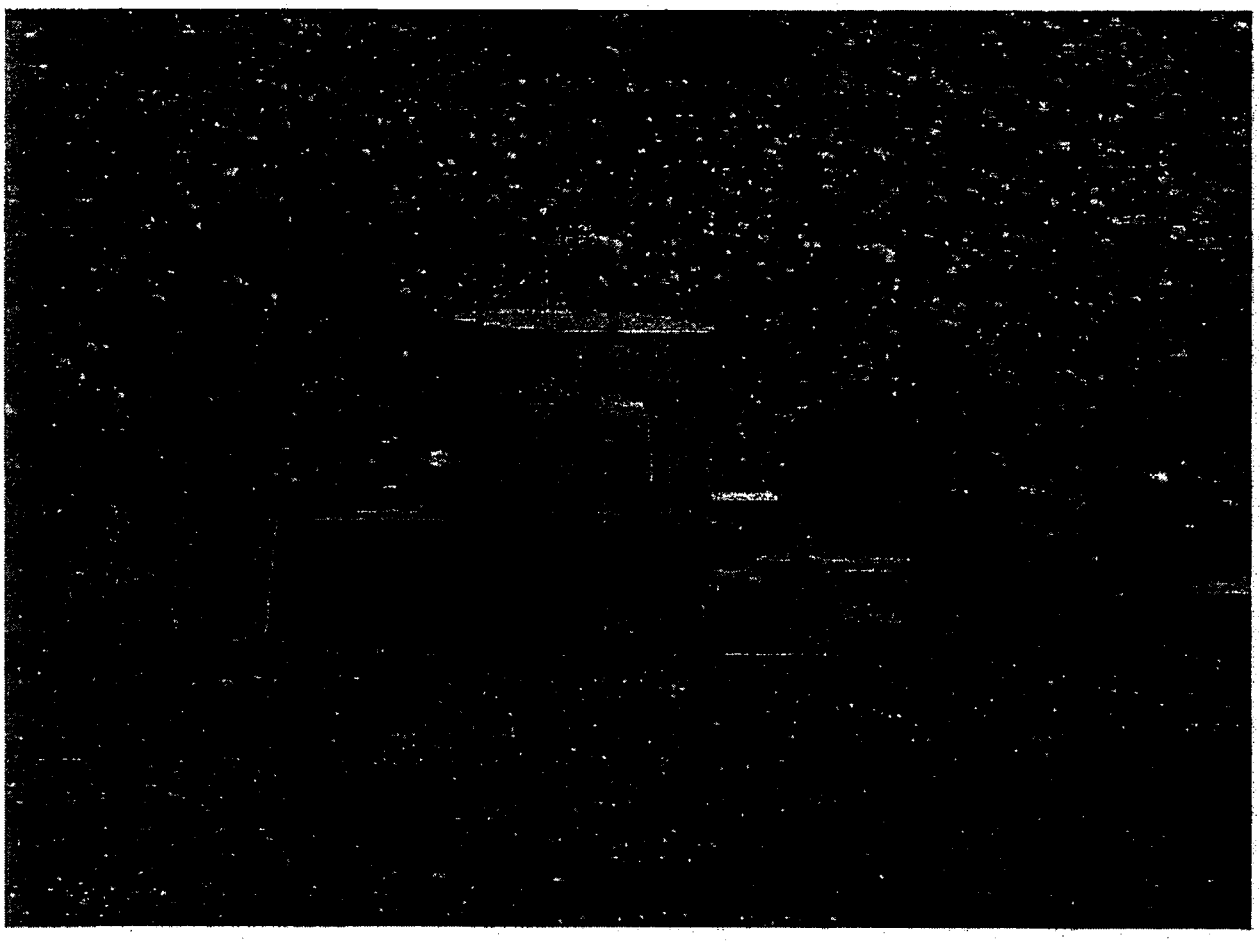
Site Summary Report 04/27/2011

Site Code: 100-N-53 | Site Classification Status: Accepted | Page 3

Image:

Date Taken: Historical Photo Number:

Description:



RCC Stewardship Information System
Site Summary Report

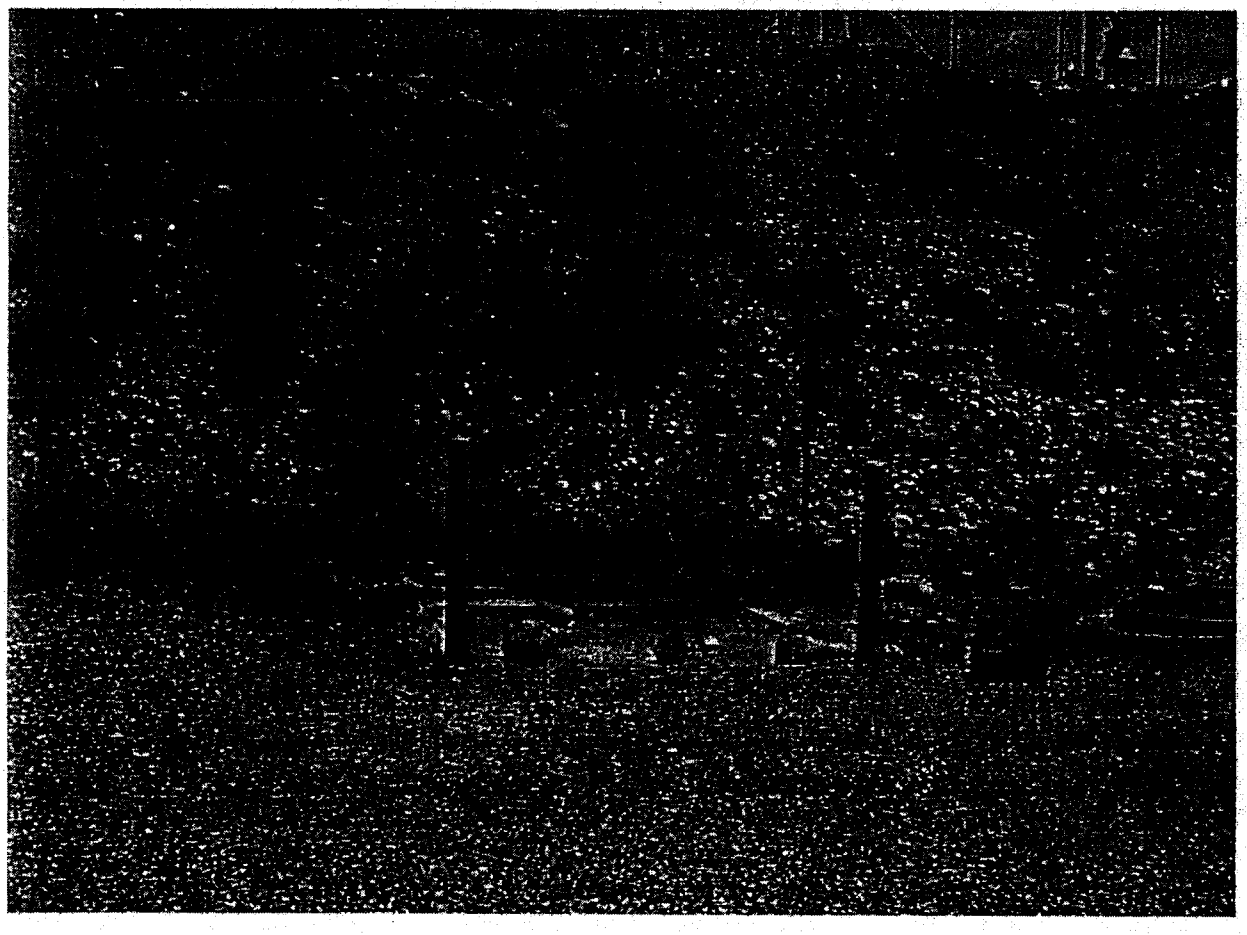
04/27/2011

Site Code: 100-N-53 | Site Classification Status: Accepted | Page 4

Image:

Date Taken: 7/8/1999 Historical Photo Number:

Description: Photo shows the waste oil tank foundation. The tank has been removed.



RCC Stewardship Information System

Site Summary Report

04/27/2011

Site Code: 100-N-61 | **Site Classification Status: Accepted** |

Site Names: 100-N-61, 100-N Water Treatment and Storage Facilities Underground Pipelines

Site Type: Process Sewer
Status: Inactive
Decision Unit: 100-N
Operable Unit: 100-NR-1
Hanford Area: 100N
QC Code: QC Date:

Start Date: 1963
End Date: 1987
Coordinates:
(E) 0.0
(N) 0.0
Washington State Plane

Cleanup Activities:

Cleanup Summary: The 100-N-61 waste site pipelines are located through out the 100-N Area and are collocated with a number of other pipeline waste sites including but not limited to the 100-N-84, 100-N Miscellaneous Pipelines waste site. During remediation of the 100-N-61 waste site collocated waste sites may be partially or fully remediated.

Contaminants of Concern:

Excavation Depth (m):
Excavation Area (sq. m):
Site Revegetated (Yes/No):
Site Downposted (Yes/No):
Institutional Controls Required (Yes/No):
Institutional Controls:

Depth to GW below excavation (m):
Material disposed at ERDF (metric tons):

Historical Summary:

Site Description: The site encompasses all underground water pipelines used to transport reactor cooling water between water treatment facilities and the 105-N Reactor Building. These include all underground lines running between buildings and those that run to drainage facilities. Pipelines within buildings and all pipelines that are downstream from the reactor building, i.e., those lines that carry cooling water from the reactor to effluent disposal facilities such as the dump tank and cribs are excluded.

Process Description: Reactor cooling water was pumped from the Columbia River, settled and treated to remove minerals, then injected into the reactor primary coolant loop at a rate of about 760 liters/minute (200 gallons/minute).

Location Description: The site is located where the underground pipelines run from the 181-N River Pump House to the 163-N Water Treatment Plant, the 182-N Pump House and Storage Tanks, and to the 105-N Reactor Building. Also, any underground drainage pipelines running from the water treatment and storage facilities to the riverside outfall structures. Other underground pipelines running to the outfall structures are included in other waste sites and are therefore excluded from this site.

Associated Structures: Associated structures include the 181-N River Pump House, the 182-N Pump House, the 163-N Water Treatment Plant, and the 105-N Reactor Building.

Site Comment: Two above ground features (N-215 an N-217) were observed during the 100-N Orphan Site Evaluation that fell within the planned excavation footprint for 100-N-61 (OSR-2009-0001). As a consequence these features will be dispositioned during remediation of 100-N-61 and were not further evaluated.

A 7.6-cm (3-in.) french drain located 2.8 m (9.2 ft) to the east of the 1902-H building wall, and the location of a french drain with a 1.9-cm (0.75-in.) clean medium-pressure steam return line from the 108-N building (removed during the demolition of the 108-N building), both part of the 100-N-103 waste site, fall within the planned excavation footprint for 100-N-61. As a consequence these features will be dispositioned during remediation of the 100-N-61 waste site.

RCC Stewardship Information System
Site Summary Report

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Site Code: 100-N-61 | Site Classification Status: Accepted | Page 2

Waste Information:

Type:	Water	Amount:	
Category:	Nondangerous/nonradioactive	Units:	
Physical State:	Solid and liquid		
Waste Obscured:	Soil Overburden		
COPCs			
Description:	The waste is steel piping, concrete, and soil (if contaminants are present). Chemical additives to the reactor cooling water included sulfuric acid, sodium hydroxide, aluminum sulfate (alum) with excess hydrated calcium oxide, separan, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, and the free chlorine residual was approximately 0.2 milligrams/liter.		
References:	1. WHC-SD-EN-TI-251, 06/01/1994, 100-N Area Technical Baseline Report, Rev. 0, Westinghouse Hanford Company		

Unplanned Release:

Release Name: 100-N-7

Reported Date:	Occurrence Rpt#:
Begin Date:	Ref. Site Code:
End Date:	

Description: 100-N-7 was an unplanned release that occurred in underground discharge pipelines associated with this site.

References: 1. Other10311996-2, 10/31/1996, Discovery Site, 100-N Water Treatment Facility Underground Water Pipelines, Bechtel Hanford Inc.

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-61 | Site Classification Status: Accepted | Page 3

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit: No

RCRA Part B Permit: No

Closure Plan:

RCRA Closure Type:

Residual Waste: No

Other Permitting:

2126/218 Permit: No

NPDES: No

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH, Washington Closure Hanford, LLC

ESD Document:

Decision Document: Interim Remedial Action Record of Decision, 100-NR-1 and 100-NR-2 (1999)

Closure Document:

Site References:

1. OSR-2009-0001, 06/01/2009, 100-N Area Orphan Sites Evaluation Report, Rev. A, Washington Closure Hanford, LLC
2. Other10311996-2, 10/31/1996, Discovery Site, 100-N Water Treatment Facility Underground Water Pipelines, Bechtel Hanford Inc.

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-64 | **Site Classification Status: Accepted** | Page 1

Site Names:	100-N-64, 100-N Reactor 105/109-N Cooling Water Effluent Underground Pipelines		
Site Type:	Radioactive Process Sewer	**Start Date:**	1963
Status:	Inactive	**End Date:**	1987
Decision Unit:	100-N	**Coordinates:**	
Operable Unit:	100-NR-1	(E)	0.0
Hanford Area:	100N	(N)	0.0
QC Code:	**QC Date:**	Washington State Plane	

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):

Depth to GW below excavation (m):

Excavation Area (sq. m):

Material disposed at ERDF (metric tons):

Site Revegetated (Yes/No):

Site Downposted (Yes/No):

Institutional Controls Required (Yes/No):

Institutional Controls:

Historical Summary:

Site Description: This site includes those underground pipelines that transported reactor cooling water from the 105-N Reactor facilities to the 116-N-4 (1300-N), the 1304-N Emergency Dump Basin and Tank respectively, the 107-N Filter Building and the pipelines from these facilities to the 1908-N Outfall Structure. It does not include the underground lines that discharge to the 1301-N (116-N-1) and/or 1325-N (116-N-3) Cribs that are addressed by a separate Waste Information Data System (WIDS) entry for the 105-N Reactor, 1314-N, 116-N-1, and 116-N-3 underground pipelines (site 100-N-63).

Generally these lines leave the 105-N Reactor Building on the west side and proceed to the west to their respective treatment/disposal facilities. The 107-N Building includes return pipelines as well as other process pipelines contained in a concrete encasement between the 105-N and 107-N Buildings. This encasement houses 0.26-meter (10-inch) and 0.46-meter (18-inch) demineralized water lines, a 0.3-meter (12-inch) filtered water line, 1.3-centimeter (0.5-inch) instrument air, 5.1-centimeter (2-inch) steam, 15-centimeter (6-inch) fire, line and telephone, instrument, power, and fire alarm lines. The encasement is about 30 meters (98 feet) long. The remaining underground pipelines associated with the 1300-N and 1304-N include a 0.76-meter (30-inch) flush line, a 0.61-meter (24-inch) vent, a 0.76-meter (30-inch) overflow, a 25.4-centimeter (10-inch) blowdown, and a connection to the 25.4-centimeter (10-inch) radioactive drain line that becomes the 0.3-meter (12-inch) radioactive drain line not included with this waste site. The site does include overflow lines to the 1908-N Outfall Structure, but does not include the 1908-N Outfall Structure itself.

Process Description: The Emergency Dump Basin (116-N-4/1300-N) and the Emergency Dump Tank (1304-N) were designed to receive "single-pass" reactor cooling water in the case of an emergency. Both systems were used to periodically receive steam blowdown. The 1304-N Tank replaced the 1300-N Basin. This steam condensate normally contained low levels of radionuclide contamination and fission products. Overflow and drain lines to the 1908-N Outfall Structure are include in this waste site. However, the outfall structure is a separate waste site.

Location Description: This site is the location of underground pipelines running between the 105/109-N Buildings to the 116-N-4 (1300-N), the 1304-N Emergency Dump Basin and Tank, the 107-N Filter Building to the 1908-N Outfall Structure.

Associated Structures: The associated structures are the 105-N and 109-N Reactor Buildings. The TSD pipelines are in site 100-N-63.

Site Comment:

RCC Stewardship Information System
Site Summary Report

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Site Code: 100-N-64 | Site Classification Status: Accepted | Page 2

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Radioactive	Units:	
Physical State:	Solid and liquid		
Waste Obscured:	Soil Overburden		
COPCs			
Description:	The waste is the contaminated underground pipelines. The following radionuclides were released from the reactor through the underground pipelines to the 116-N-4 (1300-N), 1304-N Emergency Dump Basin and Tank, the 107-N Filter Building and to the 1908-N Outfall Structure. Residual contaminants of some may be expected to remain in the underground pipelines. These include: sodium-24, niobium-95, iodine-131, chromium-51, zirconium -95, tellurium-132, technetium-99, manganese-54, iron-59, ruthenium-103, cerium-144, and cobalt-60. Because of radioactive decay, only manganese-54, cobalt-60, and cerium-144 are expected to remain.		
References:			

Regulatory Info:

RCRA Permiting:		Other Permitting:	
TSD Number:		2126/218 Permit:	No
RCRA Part A Permit:	No	NPDES:	No
RCRA Part B Permit:	No	Air Operating Permit Numbers():	
Closure Plan:			
RCRA Closure Type:			
Residual Waste:	No		

Remediation and Closure:

Closure Contractor:	WCH. Washington Closure Hanford, LLC
ESD Document:	
Decision Document	Interim Remedial Action Record of Decision, 100-NR-1 and 100-NR-2 (1999)
Closure Document:	

Site References:

1. H-1-45007, Sheet 2, 01/21/1985, COMPOSITE UNDERGROUND LINES, Rev. 4, United Nuclear Industries
2. H-1-45007, Sheet 30, 01/14/1985, COMPOSITE UNDERGROUND LINES, Rev. 4, United Nuclear Industries
3. H-1-45007, Sheet 31, 06/21/1985, COMPOSITE UNDERGROUND LINES, Rev. 4, United Nuclear Industries
4. H-1-45007, Sheet 37, 06/26/1985, COMPOSITE UNDERGROUND LINES, Rev. 4, United Nuclear Industries
5. H-1-45007, Sheet 38, 06/21/1985, COMPOSITE UNDERGROUND LINES, Rev. 3, United Nuclear Industries
6. Other11061996-1, 11/06/1996, Discovery Site, 100-N Reactor 105/109-N Cooling Water Effluent Underground Lines, Bechtel Hanford Inc.
7. WHC-SD-EN-TI-251, 06/01/1994, 100-N Area Technical Baseline Report, Rev. 0, Westinghouse Hanford Company

RCC Stewardship Information System

Site Summary Report

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Site Code: 100-N-84 | **Site Classification Status: Accepted** | **Page 1**

Site Names:	100-N-84, 100-N Miscellaneous Pipelines		
Site Type:	Product Piping	**Start Date:**	
Status:	Inactive	**End Date:**	
Decision Unit:	100-N	**Coordinates:**	
Operable Unit:	100-NR-1	(E)	
Hanford Area:	100N	(N)	
QC Code:	**QC Date:**	Washington State Plane	

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):

Depth to GW below excavation (m):

Excavation Area (sq. m):

Material disposed at ERDF (metric tons):

Site Revegetated (Yes/No):

Site Downposted (Yes/No):

Institutional Controls Required (Yes/No):

Institutional Controls:

Historical Summary:

Site Description: This site consists of all miscellaneous pipelines in the 100-N Area that were identified during the Orphan Site Evaluation (OSE) process and not previously tied to an existing waste site. The site includes product pipelines, service water pipelines, sewers and associated features (manholes, storm drains, valve boxes, etc.). Helium lines, electrical conduit, telephone lines, electrical grounding lines (ground), control air supply, fire alarm systems were excluded from the site.

The site includes the following subsites:

100-N-84:1, 100-N Area Raw Water Pipelines
100-N-84:2, 100-N Area Fuel and Foam Pipelines
100-N-84:3, 100-N Area Filtered and Potable Water Pipelines
100-N-84:4, 100-N Area Steam and Condensate Pipelines
100-N-84:5, 100-N Area Sanitary Pipelines
100-N-84:6, 100-N Area Chemical and Process Sewer Pipelines
100-N-84:7, 100-N Area Unidentified and Other Miscellaneous Pipelines
100-N-84:8, 100-N Area Unidentified Pipelines within Planned Excavations
100-N-84:9, 100-N Area Active Raw Water Pipelines

Process Description: The miscellaneous pipelines supported the reactor operation and related support facilities throughout the N-Area. The process description is provided for each of the subsites in their respective writeups.

Location Description: The pipeline segments within the 100-N Area were mapped in the WCH Geographic Information System (GIS) database.

Associated Structures:

Site Comment: The pipelines are generally encased in horizontal pipe trays in many cases the utility lines are co-located within the concrete encasements. No evaluation has been conducted to determine if the co-located utility lines (electrical, telephone, instrumentation, etc) are active.

RCC Stewardship Information System
Site Summary Report

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Site Code: 100-N-84 | Site Classification Status: Accepted | Page 2

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH, Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:2 | Site Classification Status: Accepted | Page 1

Site Names:	100-N-84:2, 100-N Area Fuel and Foam Pipelines		
Site Type:	Product Piping	Start Date:	1963
Status:	Inactive	End Date:	1987
Decision Unit:	100-N	Coordinates:	
Operable Unit:	100-NR-1	(E)	
Hanford Area:	100N	(N)	
QC Code:	QC Date:	Washington State Plane	

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):

Depth to GW below excavation (m):

Excavation Area (sq. m):

Material disposed at ERDF (metric tons):

Site Revegetated (Yes/No):

Site Downposted (Yes/No):

Institutional Controls Required (Yes/No):

Institutional Controls:

Historical Summary:

Site Description: The 100-N-84:2 subsite includes the fuel oil and foam underground pipelines in the 100-N Area.

Process Description: Two fuel oil unloading, storage and transfer systems were used in the 100-N Area.

Diesel oil unloaded from rail cars at the 166-N unloading station was transferred for storage to the one of four aboveground storage tanks within the 1715-N Building. The diesel oil was then transferred through a 10.2 cm (4-in) underground supply pipeline to the 184-N Building day tank or through 5.1 cm (2-in) and 10.2 cm (4-in) underground pipelines to the three 56,781 L (15,000 gal) day tanks outside of the 182-N building. The diesel fuel from the 182-N day tanks was used to support the 182-N and 181-N diesel oil systems.

Number 6 fuel oil (also known as Bunker C fuel oil) was unloaded from rail cars at the 1900-N unloading station and transferred to the 166-N Building for storage in a 5,204,941 L (1,375,000 gal) capacity aboveground storage tank. The No. 6 fuel oil was transferred through underground pipelines from 166-N to two 184-N fuel oil day tanks.

Foam fire suppression lines to support the diesel oil tanks and pipelines are collocated with the diesel oil pipelines near the 166-N Building.

The north west portions of the 100-N-84:2 pipelines are located within the 100-N-63 excavation footprint (H-1-89933).

The site includes eight drywells that were located along the west side of the fuel oil unloading trench. The drywells were composed of buried 30-inch open ended, concrete pipe designed to hold a 30-gallon drum. The drums collected drainage from hoses for railroad tank cars or truck onloading. When filled, the drum could be removed and emptied (121453).

Location Description: Fuel and foam pipelines are located to the north west and west side of the 105-N Reactor Building.

Associated Structures: 166-N Fuel Oil Pump House, 166-N Fuel Oil Unloading Station, and 1715-N Fuel Oil Storage Tanks 1-5.

Site Comment: 100-N-84:2 was recommended for cleanup by remove, treat, and dispose in August 2010 (152843).

RCC Stewardship Information System
Site Summary Report

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Site Code: 100-N-84:2 | Site Classification Status: Accepted | Page 2

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH. Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. 121453, 06/06/2005, Facility Inspection Summary for the 166-N Fuel Oil Pump House, Unloading Station and Storage Tank, Washington Closure Hanford, LLC
2. 152843, 08/12/2010, 100-N-84:2, 100-N Fuel and Foam Pipelines Remove, Treat, and Dispose Report, Washington Closure Hanford, LLC
3. D4-100N-004, 08/15/2006, D4 Project Soils or Below Grade Structures Deferral Form (166-N & 1715-N), Washington Closure Hanford, LLC
4. H-1-89933, 03/23/2010, 100-N AREA - 100 N WASTE SITE REMEDIATION DESIGN - 100-N-63 EFFLUENT PIPELINES OVERALL PLOT PLAN, Rev. 1, Washington Closure Hanford, LLC

RCC Stewardship Information System
Site Summary Report

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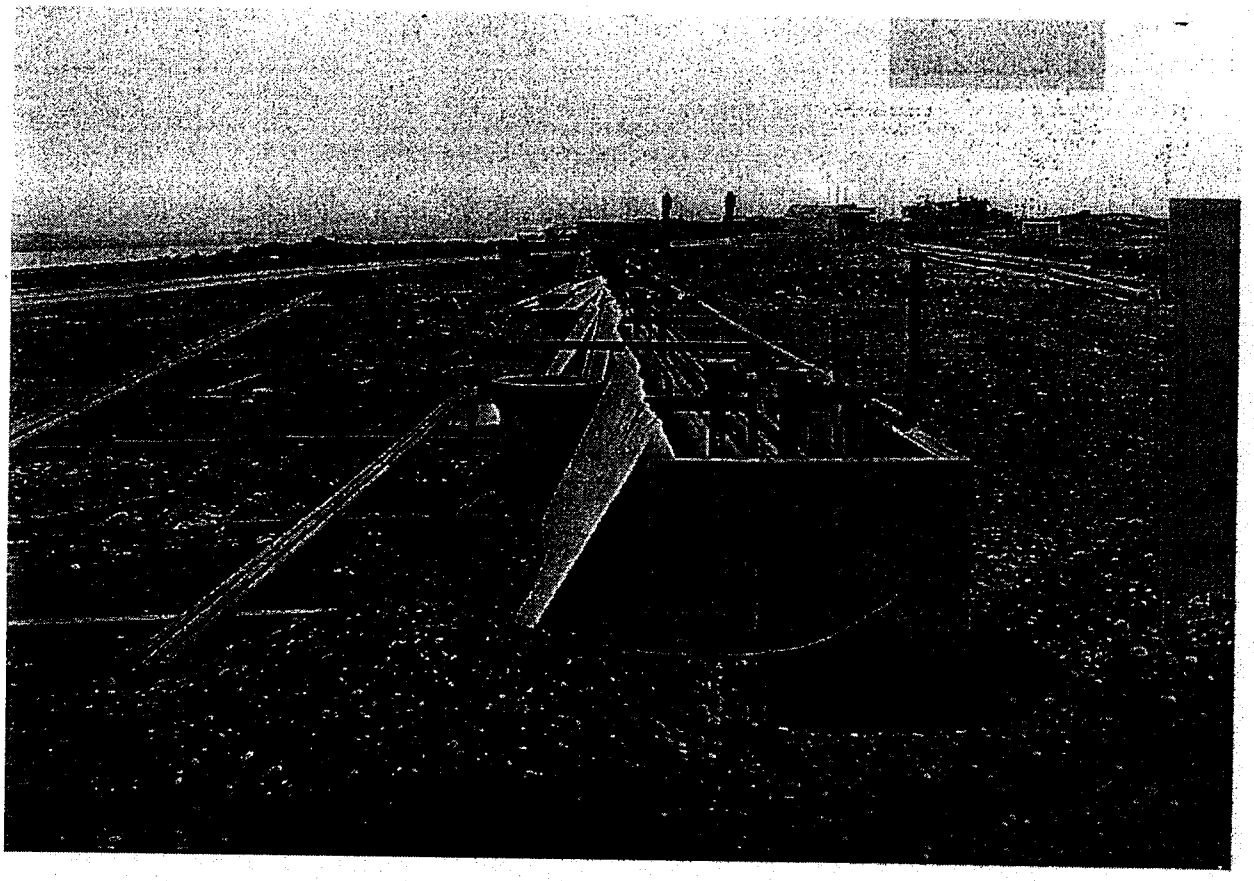
Site Code: 100-N-84:2 | Site Classification Status: Accepted | Page 3

Image:

Date Taken: 11/27/1961 Historical Photo Number: 7915-PHOTO

Description: 1908-N Fuel Oil and Diesel Oil Unloading Facility with french drains visibible.



RCC Stewardship Information System

Site Summary Report

04/27/2011

Site Code: 100-N-84:3 | **Site Classification Status: Accepted** |

Site Names: 100-N-84:3, 100-N Area Filtered and Potable Water Pipelines

Site Type: Product Piping
Status: Inactive
Decision Unit: 100-N
Operable Unit: 100-NR-1
Hanford Area: 100N
QC Code: QC Date:

Start Date: 1963
End Date: 1987
Coordinates:
(E)
(N)
Washington State Plane

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):
Excavation Area (sq. m):
Site Revegetated (Yes/No):
Site Downposted (Yes/No):
Institutional Controls Required (Yes/No):
Institutional Controls:

Depth to GW below excavation (m):
Material disposed at ERDF (metric tons):

Historical Summary:

Site Description: The 100-N Area filter and potable water pipelines includes: makeup water, filter water, demineralized water, and potable water pipelines.

Process Description: Raw water was supplied to 183-N Filter Plant Building for pretreatment and filtration. The 183-N filter plant supplied sanitary water to the entire 100-N Area. The plant also supplied filtered water to various buildings throughout the 100 N Area for use where treated water was not desirable or required. The term "treated water" herein refers to filtered water that had liquid alum (aluminum sulphate), separan (polyacrylamide) and liquid chlorine added during pretreatment. Demineralized water from 163-N Building was used as makeup water feed for the pretreatment system in 183-N building, while raw water was used for chemical mixing in the 182-N and 183-N Buildings prior to being added to the water. The chemical feed systems were maintained using proportional ratios with the water flow. Demineralized water was used to prevent mineral deposits what would foul pipeline systems.

Chlorine was added for the control of slime and algae, and may have been used to assist in coagulation, odor and iron removal problems. Alum was used as the principle coagulant during pretreatment.

100-N-84:3 pipelines located between the 109-N, 182-N, 183-N and the183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-89932). This area was excavated and backfilled in 2008 through 2009. The north west portions of the 100-N-84:3 pipelines are located within the 100-N-63 excavation footprint (H-1-89933).

Location Description: Filtered water lines are located to the north and south of the 105-N reactor Building, while the potable water lines are located mainly to the southwest of the 105 reactor building to the 105-N support facilities.

Associated Structures:

Site Comment:

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:3 | Site Classification Status: Accepted | Page 2

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH, Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. H-1-89932, 03/23/2010, 100-N AREA - 100 N WASTE SITE REMEDIATION DESIGN - 100-N-61 WTR TREATMENT PIPELINES OVERALL PLOT PLAN, Rev. 1, Washington Closure Hanford, LLC
2. H-1-89933, 03/23/2010, 100-N AREA - 100 N WASTE SITE REMEDIATION DESIGN - 100-N-63 EFFLUENT PIPELINES OVERALL PLOT PLAN, Rev. 1, Washington Closure Hanford, LLC

RCC Stewardship Information System

Site Summary Report

04/27/2011

Site Code: 100-N-84:5 **Site Classification Status: Accepted** Page 1

Site Names:	100-N-84:5, 100-N Area Sanitary Pipelines		
Site Type:	Product Piping	**Start Date:**	1963
Status:	Inactive	**End Date:**	1987
Decision Unit:	100-N	**Coordinates:**	
Operable Unit:	100-NR-1	(E)	
Hanford Area:	100N	(N)	
QC Code:	**QC Date:**	Washington State Plane	

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):

Depth to GW below excavation (m):

Excavation Area (sq. m):

Material disposed at ERDF (metric tons):

Site Revegetated (Yes/No):

Site Downposted (Yes/No):

Institutional Controls Required (Yes/No):

Institutional Controls:

Historical Summary:

Site Description: The 100-N Area sanitary pipelines includes: sanitary water and sewer, storm drains, and disposal field pipelines.

Process Description: The 100-N Area was serviced by ten separate sewer systems consisting of one cesspool, one lagoon, one septic tank with an associated tile field, two septic tanks with seepage pits, and five septic tanks associated with drain fields. The septic tanks, pits, cesspools and lagoon are identified as the 124-N-1 through 124-N-10 waste sites. Waste sites 124-N-5, 124-N-6, 124-N-7, 124-N-8 have been reclassified as "rejected". The feed and drainage pipelines associated with these waste sites are included in 100-N-84:5.

Location Description: The 100-N-84:5 pipelines are located throughout the 100-N Area's 100-NR-1 operable unit.

Associated Structures:

Site Comment:

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:5 | Site Classification Status: Accepted | Page 2

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH, Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. 0100N-WI-G0011, 08/26/2010, Work Instruction for Confirmatory Sampling of the 100-N-84:5, 100-N Area Sanitary Pipelines, Rev. 0, Washington Closure Hanford, LLC

RCC Stewardship Information System

Site Summary Report

04/27/2011

Site Code: 100-N-84:6 | Site Classification Status: Accepted | Page 1

Site Names:	100-N-84:6, 100-N Area Chemical and Process Sewer Pipelines		
Site Type:	Product Piping	Start Date:	1963
Status:	Inactive	End Date:	1987
Decision Unit:	100-N	Coordinates:	
Operable Unit:	100-NR-1	(E)	
Hanford Area:	100N	(N)	
QC Code:	QC Date:	Washington State Plane	

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):

Depth to GW below excavation (m):

Excavation Area (sq. m):

Material disposed at ERDF (metric tons):

Site Revegetated (Yes/No):

Site Downposted (Yes/No):

Institutional Controls Required (Yes/No):

Institutional Controls:

Historical Summary:

Site Description: 100-N Area Chemical and Process Sewer Pipelines include: Chemical waste, DMV waste, drain cold, dummy disposal line, Miscellaneous chemical drain, radioactive drain, chlorine, flush, and sample pipelines.

Process Description: The 100-N-84:6 pipelines originate from the 109-N Heat Exchanger Building, the 105-N Reactor Building, the 163-N Demineralization Plant, 182-N High-Lift Pump House, 183-N Filter Plant, and 184-N Power House. Various chemicals were utilized in these buildings.

Phosphoric, ascorbic and citric acids, and potassium permanganate were used in the 109-N and 105-N Buildings decontamination processes (WHC-SP-0460).

Ammonium hydroxide, morpholine and lithium hydroxide were added to control cooling water pH. Hydrazine was added to reduce oxygen concentrations in cooling water (WHC-SP-0460). The addition of these chemicals and the core's cooling water system design allowed the water to recycled instead of using raw water as a once through coolant (DOE/RL-90-22)

Sulfuric acid and sodium hydroxide from supply tanks in 163-N Building were primarily consumed in the demineralizer plant. A 93% sulfuric acid solution was used to regenerate the cation resin used at the 163-N Building while a 50% sodium hydroxide solution was use to regenerate the anion resin. The 8-in acid drain from 163-N connected into the 100N river channel discharge line to the Columbia River.

Sodium sulfite was used as a deoxygenizing chemical for low pressure filter water (182-N).
Sodium dichromate was added to filtered water supply and raw water supply for cooling coils in the 105-N Reactor Building.

Radioactive drains at 109-N collect from the coolant systems, hot water quality laboratory, service bay hot shop. The 105-N and 109-N drains run to the 1301-N Liquid Waste Disposal Crib.

100-N-84:6 pipelines located between the 109-N, 182-N, 163-N and the183-N Buildings lay within the 100-N-61 water treatment pipeline removal excavation footprint (H-1-89932). This area was excavated and backfilled in 2008 through 2009. A small portion of the 100-N-84:6 pipelines also lay within the adjacent 100-N-64 planned excavation (H-1-89934).

Location Description: The 100-N-84:6 waste site pipelines are centrally located between the 100-N Area process buildings (105-N, 109-N, 182-N, 183-N, 184-N, and 163-N).

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:6 | Site Classification Status: Accepted | Page 2

Associated Structures:

Site Comment: 100-N-84:6 was recommended for cleanup by remove, treat, and dispose in August 2010 (152863).

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH. Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. 152863, 08/16/2010, 100-N-84:6, 100-N Area Chemical and Process Sewer Pipelines Remove, Treat, and Dispose Report, Washington Closure Hanford, LLC
2. DOE/RL-90-22, 03/01/1996, RCRA Facility Investigation Corrective Measures Study Work for the 100-NR-1 Operable Unit, Hanford Site, Richland, Washington, Rev. 0, U.S. Department of Energy - Richland Operations Office
3. H-1-89932, 03/23/2010, 100-N AREA - 100 N WASTE SITE REMEDIATION DESIGN - 100-N-61 WTR TREATMENT PIPELINES OVERALL PLOT PLAN, Rev. 1, Washington Closure Hanford, LLC
4. H-1-89934, 03/23/2010, 100-N AREA - 100 N WASTE SITE REMEDIATION DESIGN - 100-N-64 COOLING WTR PIPELINES OVERALL PLOT PLAN, Rev. 1, Washington Closure Hanford, LLC
5. WHC-SP-0460, 06/01/1989, Chemical Spill Prevention Control and Countermeasures Plan 100 Areas, Westinghouse Hanford Company

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:7 | **Site Classification Status: Accepted** | Page 1

Site Names: 100-N-84:7, 100-N Area Unidentified and Other Miscellaneous Pipelines

Site Type: Product Piping
Status: Inactive
Decision Unit: 100-N
Operable Unit: 100-NR-1
Hanford Area: 100N
QC Code: **QC Date:**

Start Date: 1963
End Date: 1987
Coordinates:
(E)
(N)
Washington State Plane

Cleanup Activities:

Cleanup Summary:

Contaminants of Concern:

Excavation Depth (m):
Excavation Area (sq. m):
Site Revegetated (Yes/No):
Site Downposted (Yes/No):
Institutional Controls Required (Yes/No):
Institutional Controls:

Depth to GW below excavation (m):
Material disposed at ERDF (metric tons):

Historical Summary:

Site Description: The 100-N-84:7 waste site pipelines include sections of various diameter pipelines located within the 100-NR-1 operable unit which could not be positively identified based on review of historical documentation. These pipelines include those described as unidenitifed or multitube.

Process Description:

Location Description: The 100-N-84:7 pipelines are located throughout the 100-N Area"s 100-NR-1 operable in and around the 105-N Reactor Building.

Associated Structures:

Site Comment: An above ground features (N-213) was observed during the 100-N Orphan Site Evaluation to be co-located with the 100-N-84 pipelines (OSR-2009-0001). As a consequence this feature was dispositioned as part of 100-N-84.

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:7 | Site Classification Status: Accepted | Page 2

Regulatory Info:

RCRA Permiting:

TSD Number:

RCRA Part A Permit:

RCRA Part B Permit:

Closure Plan:

RCRA Closure Type:

Residual Waste:

Other Permitting:

2126/218 Permit:

NPDES:

Air Operating Permit Numbers():

Remediation and Closure:

Closure Contractor: WCH. Washington Closure Hanford, LLC

ESD Document:

Decision Document

Closure Document:

Site References:

1. 0100N-WI-G0012, 02/01/2011, Work Instruction for Confirmatory Sampling of the 100-N-84:7, 100-N Unidentified and Other Miscellaneous Pipelines, Rev. 0, Washington Closure Hanford, LLC
2. OSR-2009-0001, 06/01/2009, 100-N Area Orphan Sites Evaluation Report, Rev. A, Washington Closure Hanford, LLC

RCC Stewardship Information System
Site Summary Report

04/27/2011

Site Code: 100-N-84:7 | Site Classification Status: Accepted | Page 3

Image:

Date Taken: 5/27/2008 Historical Photo Number:

Description: OSE feature N-213 (looking north). The access lid was labeled as a confined space. Photograph is named 05272008 -206-1240.

Attachment 11

Phase 1 Ex-Situ Bioremediation Plan Treatment Evaluation Summary for Shallow Petroleum Waste Sites at 100-N

Waste Site	Title	Description/Status	WCH Document number	Ex-situ bioremediation Yes/No	Evaluation Based on Sample Data and Waste Material Description
UPR-100-N-18	166-N Four-inch Diesel Oil Supply Line to 184-N Leak, UN-100-N-18	Diesel oil leak from transfer line between 166-N and 184-N. Included in the scope of this plan.	CCN 162934	No	The UPR-100-N-18 waste site excavated, material consisted of nearly a 50:50 mixture of construction debris (asphalt, concrete, piping, and metal) and soil/rocks (see photos below). Due to the amount of debris it is not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil.
UPR-100-N-19	184-N Day Tank Fuel Oil Spill, UN-116-N-19, UN-100-N-19	No. 6 fuel oil leak at 184-N Day Tank Storage Facility. All fuel oil reportedly contained, removed, and disposed. Included in the scope of this plan.	CCN 160246	No	UPR-100-N-19 is collocated with UPR-100-N-21, UPR-100-N-22, UPR-100-N-23 and UPR-100-N-43 (see Figure B-3 of CCN-1632732 rev 1). Therefore these waste sites were excavated and sampled as one group. Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal the grouped waste sites remediation produced a mixture of concentrated debris, rocks, and soil it was not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated.
UPR-100-N-20	166-N Two-inch Diesel Oil Return Line Leak, UN-116-N-20, UN-100-N-20	Diesel oil leak from transfer line near Tank 1 in 166-N Facility. Included in the scope of this plan.	CCN 160190	No	The UPR-100-N-20 waste site was excavated to a depth of 138.0 m exposing the 100-N-84:2 and 100-N-84:4 waste site pipelines within the remediation design. The UPR-100-N-20 soil stockpiled was a mixture of the fibrous and plastic pipe chase construction material which can not be technically segregated do its particle size. The volume of the debris (plastic and fiberous material) in the excavated soil made it technically not feasible to sort without introducing smaller of the material in to the soil to be potentially treated.
UPR-100-N-21	184-N Diesel Oil Day Tank Overflow, UN-116-N-21, UN-100-N-21	Diesel oil spill into area surrounding a day tank at 184-N Facility. 650 gallons reportedly pumped as part of cleanup. Included in the scope of this plan.	CCN 160246	No	UPR-100-N-21 is collocated with UPR-100-N-19, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43 (see Figure B-3 of CCN-1632732 rev 1). Therefore these waste sites were excavated and sampled as one group. Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal the grouped waste sites remediation produced a mixture of concentrated debris, rocks, and soil it was not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated.

Phase 1 Ex-Situ Bioremediation Plan Treatment Evaluation Summary for Shallow Petroleum Waste Sites at 100-N

Waste Site	Title	Description/Status	WCH Document number	Ex-situ bioremediation Yes/No	Evaluation Based on Sample Data and Waste Material Description
UPR-100-N-22	184-N Diesel Oil Supply Line Leak No. 1, UN-100-N-22, UN-116-N-22	Diesel oil leak from a transfer line. Petroleum product noted in well 199-N-16; subsequently pumped from well. Included in the scope of this plan.	CCN 160246	No	UPR-100-N-22 is collocated with UPR-100-N-19, UPR-100-N-21, UPR-100-N-23 and UPR-100-N-43 (see Figure B-3 of CCN-1632732 rev 1). Therefore these waste sites were excavated and sampled as one group. Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal the grouped waste sites remediation produced a mixture of concentrated debris, rocks, and soil it was not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated.
UPR-100-N-23	184-N Diesel Oil Supply Line Leak No. 2, UN-100-N-23, UN-116-N-23	Diesel oil leak from a transfer line. Petroleum product noted in well 199-N-16; subsequently pumped from well. Included in the scope of this plan.	CCN 160246	No	UPR-100-N-23 is collocated with UPR-100-N-19, UPR-100-N-21, UPR-100-N-22 and UPR-100-N-43 (see Figure B-3 of CCN-1632732 rev 1). Therefore these waste sites were excavated and sampled as one group. Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal the grouped waste sites remediation produced a mixture of concentrated debris, rocks, and soil it was not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated.
UPR-100-N-24	166-N Fuel Oil Supply Line Leak, UN-116-N-24, UN-100-N-24	Line leak reported; petroleum type and quantity unknown. Included in the scope of this plan.	CCN 160670	No	The UPR-100-N-24 waste site was generated as the result of a line leak which was scheduled for repair in 1987. No documentation of the repair showing the excavation of soil the waste site could be located. This lack of information along with the pipeline release on June 27, 2011 makes it unclear as to the source of the TPH found in the in-process samples. Treatment of contaminated soil from the June 27, 2011 release is outside the scope of the ex-situ bioremediation treatment requirements in the interim ROD. The lack of metal contamination in the coal ash in-process sample results, also indicate that this material may not be coal ash from a boiler but from some other material. This material is somewhat limited to the excavation and may not exist further along the pipeline. Because of the high levels of TPH this material will need to be removed to complete remediation of this waste site. The 100-N-84:2 and 100-N-84:4 pipelines within the excavation will also be removed for disposal at the ERDF. The UPR-100-N-24 soil stockpiled is a mixture of the "coal ash" material, soil and rocks. The effectiveness of ex-situ bioremediation of the "coal ash" material is not known. Because the TPH contamination found is due to the June 27, 2011 spill and the fine particle size of the "coal ash" material makes it technically not feasible of sorting/separation from the soil, the UPR-100-N-24 waste site material is not suitable for ex-situ bioremediation.

Phase 1 Ex-Situ Bioremediation Plan Treatment Evaluation Summary for Shallow Petroleum Waste Sites at 100-N

Waste Site	Title	Description/Status	WCH Document number	Ex-situ bioremediation Yes/No	Evaluation Based on Sample Data and Waste Material Description
UPR-100-N-36	184-N Annex, 184N, Diesel Generator Area	During excavation between 184-N and 153-N, strong smell of petroleum was noted. Included in the scope of this plan.	CCN 160247	No	Because the UPR-100-N-36 wastes site is collocated with the 153-N and 183N building foundations and waste site pipelines 100-N-61, 100-N-84:1 100-N-84:3 and 100-N-103:1 a large amount of debris was removed along with the soil. The pipelines and larger pieces of concrete foundation were removed for disposal at the ERDF. The UPR-100-N-36 soil stockpiled contains a mixture of the black material represented by in-process sample. The analytical results this material presents the only source of petroleum product contamination above the RAG within the UPR-100-N-36 waste site remediation boundary. Because of the hardness of the material it is technically unsuitable for ex-situ bioremediation. Additionally this material is of limited quantity in the soil removed from the UPR-100-N-36 waste site resulting in this site being identified as not requiring ex-situ bioremediation.
UPR-100-N-43	166-N / 184-N Pipelines Liquid Unplanned Release 2 (4/26/89, Cleaned Up)	Diesel oil leak at three flange joint locations along pipeline between 166-N and 184-N. A total of 46 drums and 8 dump trucks of soil removed. Included in the scope of this plan.	CCN 160246	No	UPR-100-N-43 is collocated with UPR-100-N-19, UPR-100-N-21, UPR-100-N-22 and UPR-100-N-23 (see Figure B-3 of CCN-1632732 rev 1). Therefore these waste sites were excavated and sampled as one group. Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal the grouped waste sites remediation produced a mixture of concentrated debris, rocks, and soil it was not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated.

Phase 1 Ex-Situ Bioremediation Plan Treatment Evaluation Summary for Shallow Petroleum Waste Sites at 100-N

Waste Site	Title	Description/Status	WCH Document number	Ex-situ bioremediation Yes/No	Evaluation Based on Sample Data and Waste Material Description
124-N-2	124-N-2 Septic Tank, 100-N Sanitary Sewer System No. 2	The unit includes a septic tank and seepage pit. The seepage pit provided approximately 18.4 square meters (200 square feet) of infiltration surface area and 8,700 liters (2,300 gallons) of fluid storage. Co-contaminants are expected and load-out to ERDF is planned.	CCN 160160	No	The approved remediation design [100N-DD-C0246 rev 1, (Figure 1)] excavation bottom is limited to the area around the septic tank and cesspool which are linked by a single pipeline. Due to the amount of construction debris from the removal the concrete cesspool structure (see page 3 construction photos) the 124-N-2 remediation area will produce a mixture of concentrated debris (cesspool concrete blocks), rocks, soil and clean overburden (septic tank backfill). Based on the test pit dug on March 29th, 2011 and the amount of debris observed at the cesspool end of the excavation, it is not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated. Additionally, the quantity and size of the rocks within the excavation adds to the large amount of material not suitable for ex-situ bioremediation. This would result in a mixture of debris and rocks that make up the majority of the material to be treated along with a smaller quantity of soil. In-process sample analytical results indicate only slight TPH contamination above the direct exposure remedial action goals (RAG) of 200 mg/kg for one sample J1H0K3 (270 mg/kg) at a depth of 15 feet in the test pit which is at the ex-situ bioremediation depth limit as stated in the 100-N Area CERCLA RDR/RAWP. Metals (copper and selenium), semi-volatile organic compounds, polychlorinated biphenyls, and pesticides in-process sample results are above the ground water protection and river protection RAGs only (see attached data comparison tables). Looking at the potential migration of the COPCs with in-process sample results above the RAG, selenium has the smallest distribution coefficient (Kd) of 5 mL/g. Using this Kd, a minimum of 15 m of unsaturated vadose zone would need to exist so the drinking water concentration was zero for 1,000 years at this waste site. The water table elevation for 100-N Area is 118 m. The 124-N-2 Ecology approved remediation design (drawing 0100N-DD-C0246) has a bottom of excavation level of 135 m. The resulting vadose after remediation is expected to be 17 m.

162934

^WCH Document Control

From: Faust, Toni L
Sent: Thursday, December 15, 2011 10:48 AM
To: ^WCH Document Control
Subject: FW: Please chron UPR-100-N-19, UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43 Bio-situ evaluation

Attachments: UPR-100-N-18 Ex-situ Bioremediation Evalutation-l.doc

Please chron the attached documentation of the UPR-100-N-18, Waste Site Ex-Situ Bioremediation Evaluation in compliance with CCN 162732 and electronically distribute to the following.

Mark Buckmaster
Jeff Walker
Dan Saueressig
Toni Faust

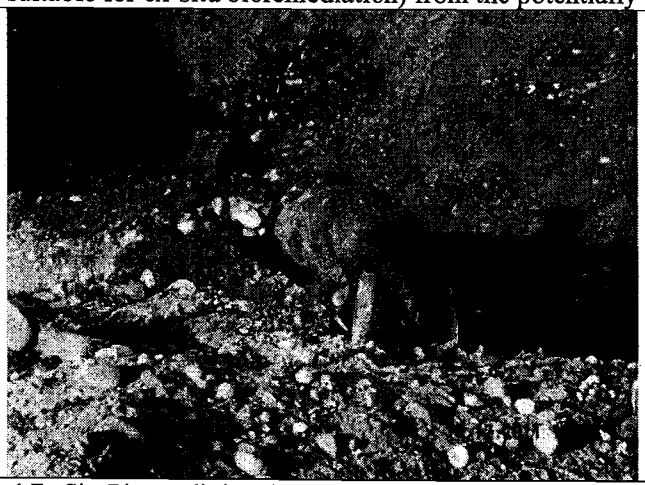
UPR-100-N-18
Ex-situ Bioremedi...

Thanks toni
100-N FR-D4 Project Interface

Waste Site:	UPR 100-N-18, 166-N Four inch Diesel Oil Supply Line to 184-N Leak
Waste Description:	The UPR-100-N-18 waste site resulted from the unplanned release of approximately 757.1 liters (200 gallons) of diesel fuel from a 10.2 cm (4-inch) pipeline in August 1973; The release occurred due to external corrosion on the pipeline. The line was excavated and repaired.
In-Process Sample Dates:	July 5, 2011
Sample Summary:	Four in-process soil samples were collected for UPR-100-N-18 for comparison the RAGs. Two from the staging pile area and two within the open excavation. Samples were collected where staining was observed. The photo below is a typical view of the material found during excavation.

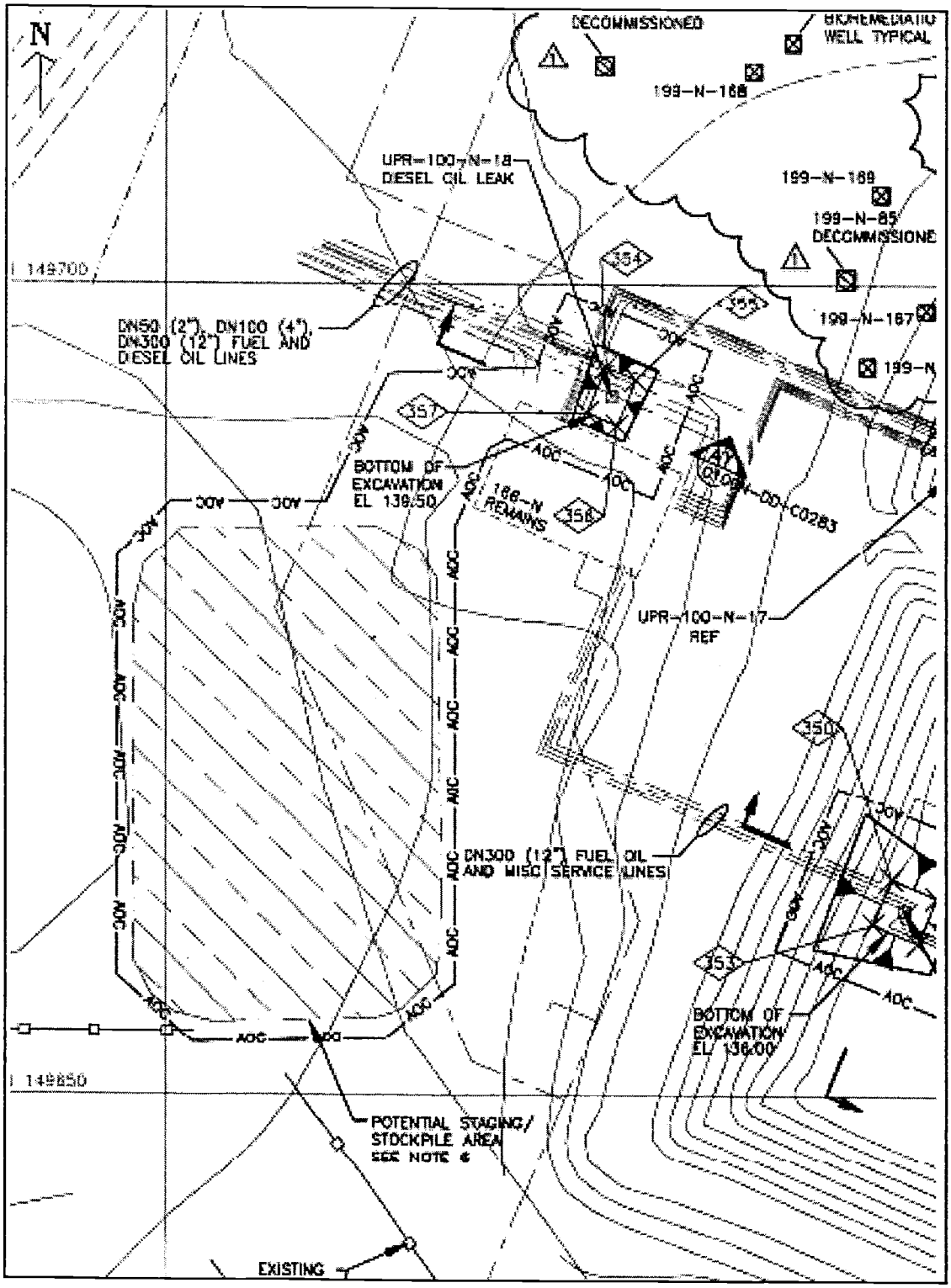
Potential Candidate for ex-situ bioremediation YES _____, NO _X___
A "NO" selection above will result in all remediated material disposed of appropriately with out treatment at the ERDF or other approved disposal facility.

Summary: The UPR-100-N-18 waste site was initially excavated to a depth of 1 m (3.3 ft) in May 2011. This material was staged and in-process samples collected. Based on further review of the wastes site, additional excavation has occurred to a depth of 4.6 m (15 ft), with expanded width and length to the excavation. As additional soil was excavated the 100-N-84:2 fuel pipelines were exposed along with concrete and other debris. The UPR-100-N-18 waste site excavated, material consisted of nearly a 50:50 mixture of construction debris (asphalt, concrete, piping, and metal) and soil/rocks (see photos below). Due to the amount of debris it is not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil.



WCH, 2011, Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites at 100-N, CCN-162732, Washington Closure Hanford, Richland Washington.

Figure 1. Excerpt from Approved UPR-100-N-18 Remediation Design



Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (pCi/g) [a]			Sample results (pCi/g) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
Radionuclides									
Ag (silver)-108m	90	2.38	--	--	--	--	--	--	--
Americium-241	200	32.1	--	--	-0.0461 U	-0.0399 U	-0.0699 U	-0.0263 U	--
Carbon-14	200	8.69	--	--	--	--	--	--	--
Cesium-137	50	6.2	1,465	2,930	0.0382 U	0.00151 U	0.0138 U	0.0154 U	--
Cobalt-60	50	1.4	13,900	27,800	0.00424 U	0.0126 U	0.00117 U	-0.0320 U	--
Curium-243	200	22.1	--	--	--	--	--	--	--
Europium-152	200	3.3	--	--	-0.0152 U	-0.0412 U	0.0115 U	-0.0402 U	--
Europium-154	200	3	--	--	-0.0289 U	-0.0173 U	-0.0153 U	-0.0162 U	--
Europium-155	200	125	--	--	-0.00203 U	0.0221 U	0.0106 U	0.00534 U	--
Iodine-129	1	0.25 [b]	0.25 [b]	0.25 [b]	--	--	--	--	--
Neptunium-237	15	2.44	0.9	1.8	--	--	--	--	--
Nickel-63	30	4,013	83	166	--	--	--	--	--
Niobium-94	200	2.43	--	--	--	--	--	--	--
Plutonium-238	200	38.8	--	--	--	--	--	--	--
Plutonium-239/240	200	35.1	--	--	--	--	--	--	--
Potassium-40	5.5	16.6 [c]	16.6 [c]	16.6 [c]	--	--	--	--	--
Radium-226	200	1.05	--	--	0.495	0.461	0.437	0.535	--
Radium-228	200	1.69	--	--	--	--	--	--	--
Strontium-90	25	4.5	27.6	55.2	0.0874 U	0.0458 U	0.0931 U	0.136 U	--
Technetium-99	0	5.8	0.46	0.92	--	--	--	--	--
Thorium-228	200	2.26	--	--	--	--	--	--	--
Thorium-230	200	2.96	--	--	--	--	--	--	--
Thorium-232	200	1.3 [c]	--	--	--	--	--	--	--
Tritium (H-3) [d]	0	459	12.6	25.2	--	--	--	--	--
Uranium-233/234	2	1.1 [c]	1.1 [c]	1.1 [c]	0.0929 U	0.0867 U	0.232	0.369	--
Uranium-235	2	0.61	0.5	0.5	-0.00727 U	0.0299 U	0.00 U	-0.00143 U	--
Uranium-238	2	1.1 [c]	1.1 [c]	1.1 [c]	0.274	0.178	0.116 U	0.452	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
Metals									
Antimony	3.76	32	5[c]	5[c]	0.39 U	0.37 U	0.37 U	0.50 U	--
Arsenic	3	20	20[c]	20	2.7	2.0	2.3	3.4	--
Barium	25	5,600	200	400	78.3 X	48.9 X	59.6 U	461 X	--
Beryllium	790	10.4	1.51[c]	1.51	0.21	0.14 B	0.16 B	0.22 B	--
Boron	3	7,200	320	--[g]	2.1	0.96 U	1.0 B	4.1	--
Cadmium	30	13.9	0.81[c]	0.81	0..093 B	0.048 B	0.059 B	0.24 B	--
Chromium, Total	200	80,000	18.5[c]	18.5	15.4 X	9.1 X	9.5 X	65.6 X	--
Chromium VI	0	2.1	4.8	2	0.230	0.155 U	0.230	1.57	--
Cobalt	50	24	15.7[c]	--[g]	8.3 X	5.8 X	8.5 X	12.5 X	--
Copper	22	2,960	59.2	22	16.6 X	12.6 X	13.3 X	20.8 X	--
Lead	30	353	10.2[c]	10.2	4.5	2.8	3.8	3.5	--
Lithium	50	160	33.5[c]	--[g]	--	--	--	--	--
Manganese	50	3,760	512[c]	512	333 X	226 X	294 X	353 X	--
Mercury	30	24	0.33[c]	0.33	0.0063 B	0.0053 U	0.0051 U	0.0072 U	--
Methyl Mercury	0.014	8	0.16	0.16	--	--	--	--	--
Molybdenum	20	400	8	--[g]	0.45 B	0.26 U	0.26 B	0.71 B	--
Nickel	65	1,600	19.1[c]	27.4	13.3 X	8.3 X	11.9 X	35.9 X	--
Selenium	5	400	5	1	0.88 U	0.85 U	0.83 U	1.1 U	--
Silver	90	400	8	0.73	0.16 U	0.16 U	0.16 U	0.21 U	--
Strontium	25	48,000	960	--[g]	--	--	--	--	--
Thallium	71	5.6	0.5[b]	0.5[b]	--	--	--	--	--
Tin	130	48,000	960	--[g]	--	--	--	--	--
Uranium (soluble salts)	2	240	3.21[c]	3.21[c]	--	--	--	--	--
Vanadium	1,000	560	85.1[c]	--[g]	59.8	38.9	63.1	84.0	--
Zinc	30	24,000	480	67.8	88.4 XN	38.0 X	48.5 X	66.1 X	--
TPH									
Diesel Range Organics (C10-C36)	50	200	200	200	**560**	120 N	**6800**	**3300**	**D, GW, RP**
Motor Oil (C10-C28)	50	200	200	200	32	59 N	**4400**	**1600**	**D, GW, RP**

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
Volatile Organics									
Acetone	0.0006	72,000	720	--	0.044	0.0076 J	0.018 J	0.0090 J	--
Carbon Tetrachloride	0.152	7.69	0.0337	0.05	0.00058 U	0.00061 U	0.00063 U	0.00089 U	--
Methylene Chloride	0.01	133	0.5	0.94	0.0022 JB	0.0021 JB	0.0020 JB	0.0035 JB	--
Toluene	0.14	6,400	64	1,360	0.00063 U	0.00066 U	0.00069 U	0.00097 UT	--
Xylene	0.233	16,000	160	--	0.00056 U	0.00059 U	0.00061 U	0.00086 U	--
Semivolatiles									
Acenapthene	4.9	4,800	96	129	0.150 J	0.077 J	0.051 UD	0.110 UD	--
Acenapthylene[f]	6.12	4,800	96	129	0.018 U	0.017 U	0.084 UD	0.190 UD	--
Anthracene	23.5	24,000	240	1,920	0.250 J	0.092 J	0.084 UD	0.420 JD	--
Benzo(a)anthracene	360	1.37	0.015[b]	0.015[b]	2.30	0.160 J	0.099 UD	0.890 JD	--
Benzo(a)pyrene	969	0.137	0.015[b]	0.015[b]	0.540	0.120 J	0.290 JD	0.740 JD	--
Benzo(b)fluoranthene	803	1.37	0.015[b]	0.015[b]	3.30 K	0.180 JK	0.170 JKD	0.290 UD	--
Benzo(k)fluoranthene	1,230	1.37	0.015[b]	0.015[b]	0.042 UK	0.041 UK	0.200 UKD	0.440 UD	--
Benzo(g,h,i)perylene[f]	2,680	2,400	48	192	0.610	0.086 J	0.410 JD	0.840 JD	--
Bis(2-chloro-1-methylethyl) ether	0.0392	14.3	0.33[b]	7.5	--	--	--	--	--
Bis(2-chloroethoxy)methane[f]	0.00277	0.909	0.33[b]	0.33[b]	0.024 U	0.023 U	0.110 UD	0.250 UD	--
Bis(2-chloroethyl) ether	0.0760	0.909	0.33[b]	0.33[b]	0.017 U	0.017 U	0.082 UD	0.180 UD	--
Bis(2-ethylhexyl)phthalate	110	71.4	0.6	0.36	0.380	0.047 U	0.340 JD	0.510 UD	--
Bromophenylphenyl ether; 4-	4.16	--	--	--	0.020 U	0.019 U	0.094 UD	0.210 UD	--
Butylbenzylphthalate	13.8	16,000	320	250	0.045 U	0.044 U	0.210 UD	0.480 UD	--
Carbazole	3.39	50	0.438	--	0.330 J	0.040 J	0.180 UD	0.400 UD	--
Chloro-3-methylphenol; 4-[f]	--	4,000	80	--	0.070 U	0.067 U	0.330 UD	0.730 UD	--
Chloroanilene; 4-	0.0725	320	6.4	--	0.086 U	0.083 U	0.410 UD	0.910 UD	--
Chloronaphthalene; 2-	2.98	6,400	64	206	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Chlorophenol;2-	0.388	400	4	19.34	0.022 U	0.021 U	0.100 UD	0.230 UD	--
Chlorophenylphenyl ether; 4-	--	--	--	--	0.022 U	0.021 U	0.100 UD	0.230 UD	--
Chrysene	200	13.7	0.12	0.1[b]	4.0	0.190 J	0.470 JD	2.00 JD	--
Dibenz(a,h)anthracene	1,790	1.37	0.03[b]	0.03[b]	0.280 J	0.100 J	0.094 UD	0.210 UD	--
Dibenzofuran	11.3	160	3.2	--	0.090 J	0.039 J	0.099 UD	0.220 UD	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Groundwater Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
Semivolatiles									
Dichlorobenzene; 1,2-	0.379	7,200	60	540	0.023 U	0.022 U	0.110 UD	0.240 UD	--
Dichlorobenzene; 1,3-	0.434	2,400	24	80	0.013 U	0.012 U	0.060 UD	0.130 UD	--
Dichlorobenzene; 1,4-	0.616	41.7	0.33 [b]	0.972	0.014 U	0.014 U	0.067 UD	0.150 UD	--
Dichlorobenzidine; 3,3-	0.724	2.22	0.33 [b]	0.33 [b]	0.095 U	0.091 U	0.450 UD	1.00 UD	--
Dichlorophenol; 2,4-	0.147	240	4.8	18.6	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Diethylphthalate	0.0820	64,000	1,280	4,600	0.027 U	0.026 U	0.130 UD	0.290 UD	--
Dimethylphthalate	0.0371	80,000	1,600	14,400	0.024 U	0.026 U	0.110 UD	0.250 UD	--
Dimethylphenol; 2,4-	0.209	1,600	32	110.6	0.070 U	0.023 U	0.330 UD	0.730 UD	--
Di-n-butylphthalate	1.57	8,000	160	540	0.031 U	0.029 U	0.140 UD	0.320 UD	--
Di-n-octylphthalate	83,200	1,600	32	--	0.015 U	0.015 U	0.071 UD	0.160 UD	--
Dinitro-2-methylphenol; 4,6-	0.6015	8	0.33 [b]	--	0.350 U	0.340 U	1.60 UD	3.60 UD	--
Dinitrophenol; 2,4-	0.00001	160	3.2	14	0.350 U	0.340 U	1.70 UD	3.70 UD	--
Dinitrotoluene; 2,4-	0.0955	160	3.2	0.33 [b]	0.070 U	0.067 U	0.330 UD	0.730 UD	--
Dinitrotoluene; 2,6-	0.0692	80	1.6	136	0.029 U	0.028 U	0.140 UD	0.310 UD	--
Ethylene glycol	0.001	160,000	320	--	--	--	--	--	--
Fluoranthene	49.1	3,200	64	18	6.2 D	0.320 J	0.180 UD	0.400 UD	--
Fluorene	7.71	3,200	64	260	0.091 J	0.050 J	0.089 UD	0.200 UD	--
Hexachlorobenzene	80	0.625	0.33 [b]	0.33 [b]	0.031 U	0.029 U	0.140 UD	0.320 DU	--
Hexachlorobutadiene	53.7	12.8	0.33 [b]	0.33 [b]	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Hexachlorocyclopentadiene	200	480	5	48	0.053 U	0.051 U	0.250 UD	0.550 UD	--
Hexachloroethane	1.78	71.4	0.313	0.38	0.022 U	0.022 U	0.110 UD	0.240 UD	--
Hydrazine	0.0143	0.333	0.33 [b]	--	--	--	--	--	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33 [b]	0.33 [b]	0.670	0.078 J	0.110 UD	0.240 UD	--
Isophorone	0.0468	1,050	9.21	1.68	0.018 U	0.017 U	0.084 UD	0.190 UD	--
Methylnaphthalene; 2-	2.98	320	3.2	--	0.082 J	0.025 J	0.094 UD	0.210 UD	--
Methylphenol; 2- (cresol;o)	0.434	4,000	80	--	0.014 U	0.013 U	0.064 UD	0.140 UD	--
Methylphenol; 4- (cresol;p)	0.434	400	8	--	0.035 U	0.034 U	0.160 UD	0.360 UD	--
Naphthalene	1.19	1,600	16	988	0.059 J	0.031 U	0.150 UD	0.340 UD	--
Nitroaniline; 2-	0.0527	240	2.4	--	0.053 U	0.051 U	0.250 UD	0.550 UD	--
Nitroaniline; 3-	0.0516	24	0.33 [b]	--	0.077 U	0.074 U	0.360 UD	0.810 UD	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
Semivolatiles									
Nitroaniline; 4-	0.0516	47.6	0.33[b]	--	0.076 U	0.074 U	0.360 UD	0.800 UD	--
Nitrobenzene	0.191	160	1.6	3.4	0.023 U	0.022 U	0.110 UD	0.240 UD	--
Nitrophenol; 2-	0.309	--	--	--	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Nitrophenol; 4-	0.309	640	12.8	1,254	0.100 U	0.098 U	0.480 UD	1.10 UD	--
Nitroso-di-n-propylamine;N-	0.0240	0.33	0.33[b]	0.33[b]	0.033 U	0.031 U	0.150 UD	0.340 UD	--
Nitrosodiphenylamine;N-	1.29	204	1.79	1.946	0.022 U	0.021 U	0.100 UD	0.230 UD	--
Pentachlorophenol	0.592	8.33	0.33	0.33	0.350 U	0.340 U	1.60 UD	3.60 UD	--
Phenanthrene[f]	23.5	24,000	240	1,920	2.2	0.420	0.084 UD	0.440 JD	--
Phenol	0.0288	24,000	480	4,200	0.019 JB	U	0.089 UD	0.200 UD	--
Pyrene	68	2,400	48	192	4.7 D	0.400	1.30 JD	1.90 JD	--
Tributyl Phosphate	1.89	185	3.3[f]	--	--	--	--	--	--
Trichlorobenzene; 1,2,4-	1.66	800	7	45.4	0.029 U	0.028 U	0.140 UD	0.310 UD	--
Trichlorophenol; 2,4,5-	1.60	8,000	80	--	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Trichlorophenol; 2,4,6-	0.381	90.9	0.795	0.42	0.011 U	0.010 U	0.050 UD	0.110 UD	--
Pesticides and PCBs									
Aldrin	48.7	0.0588	0.00165[b]	0.00165[b]	0.0027 UD	0.0025 UD	0.0025 UD	0.0036 UD	--
BHC, alpha	1.76	0.159	0.00165[b]	0.00165[b]	0.0023 UD	0.0021 UD	0.0022 UD	0.0031 UD	--
BHC, beta	2.14	0.556	0.00486	0.00554	0.0071 UD	0.0067 UD	0.0067 UD	0.0096 UD	--
BHC, delta	3.38	--	--	--	0.0043 UD	0.0040 UD	0.0041 UD	0.0058 UD	--
BHC, gamma (Lindane)	1.35	0.769	0.00673	0.0038	0.0050 UD	0.0046 UD	0.0047 UD	0.0067 UD	--
Chlordane (alpha, gamma)	51	2.86	0.025	0.0165[b]	0.0035 UD	0.0032U UD	0.0033 UD	0.0047 UD	--
Dalapon	0.00274	2,400	20	--	--	--	--	--	--
Db; 2,4-	0.1	640	12.8	--	--	--	--	--	--
DDD, 4,4'-	45.8	4.17	0.0365	0.0033[b]	0.0059 UD	0.0055 UD	0.0055 UD	0.0079 UD	--
DDE, 4,4'-	86.4	2.94	0.0257	0.0033[b]	0.0026 UD	0.0024 UD	0.0024 UD	0.0036 JXD	--
DDT, 4,4'-	678	2.94	0.0257	0.0033[b]	0.0082 JXD	0.0059 UD	0.0060 UD	0.0086 UD	--
Dicambra	0.0288	2,400	48	--	--	--	--	--	--
Dichlorophenoxyacetic acid; 2,4-	0.0294	640	7	--	--	--	--	--	--
Dichloroprop[f]	0.0294	640	7	--	--	--	--	--	--
Dieldrin	25.6	0.0625	0.0033	0.0033[b]	0.0023 UD	0.0021 UD	0.0021 UD	0.0030 UD	--
Dinoseb (DNBP)	3.54	80	0.7	--	--	--	--	--	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier				Cleanup Level Exceeded
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	
Pesticides and PCBs									
Endosulfan (I, II, sulfate)	2.04	480	9.6	0.0112	0.0031 UD	0.0029 UD	0.0055 JXD	0.028 XD	--
Endrin (and ketone, aldehyde)	10.8	24	0.2	0.039	0.0053 UD	0.0049 UD	0.033 XD	0.066 XD	--
Heptachlor	9.53	0.222	0.002 [b]	0.002 [b]	0.0023 UD	0.0021 UD	0.0022 UD	0.0031 UD	--
Heptachlor epoxide	83.2	0.11	0.002 [b]	0.002 [b]	0.0046 UD	0.0018 UD	0.0043 UD	0.0062 UD	--
Methoxychlor	80	400	4	1.67	0.0048 UD	0.0045 UD	0.0046 UD	0.0065 UD	--
MCPP [2-(2-Methyl-4-Chlorophenoxy) Propionic Acid]	48.5	80	10 (1.6)	164	--	--	--	--	--
Polychlorinated Biphenyls	309	0.5	0.017 [b]	0.017 [b]	--	--	--	--	--
PCB Aroclor-1016	107	0.5	0.017 [b]	0.017 [b]	0.0028 U	0.0028 U	0.011 UD	0.0078 UD	--
PCB Aroclor-1221	10.3	0.5	0.017 [b]	0.017 [b]	0.0082 U	0.0081 U	0.033 UD	0.023 UD	--
PCB Aroclor-1232	10.3	0.5	0.017 [b]	0.017 [b]	0.0020 U	0.0020 U	0.0083 UD	0.0056 UD	--
PCB Aroclor-1242	44.8	0.5	0.017 [b]	0.017 [b]	0.0048 U	0.0047 U	0.019U D	0.013 UD	--
PCB Aroclor-1248	43.9	0.5	0.017 [b]	0.017 [b]	0.0048 U	0.0047 U	0.019 UD	0.013 UD	--
PCB Aroclor-1254	75.6	0.5	0.017 [b]	0.017 [b]	0.035 P	0.0079 JP	0.069 D	0.032 PD	--
PCB Aroclor-1260	822	0.5	0.017 [b]	0.017 [b]	0.020 P	0.0046 JPN	0.042 D	0.016 JD	--
Silvex (tp;2,4,5-)	0.08	640	5	--	--	--	--	--	--
Toxaphene	95.8	0.909	0.2 [b]	0.2 [b]	0.170 UD	0.160 UD	0.160 UD	0.230 UD	--
Trichlorophenoxyacetic acid;2,4,5-	0.049	800	16	--	--	--	--	--	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW8 Soil from Staging Area N 149711 E 571357	J1JVW9 Soil from Staging Area N 149712 E 571357	J1JVX0 Soil from Excavation N 149693 E 571277	J1JVX1 Soil from Excavation N 149693 E 571278	Cleanup Level Exceeded
PAH									
Naphthalene	1.19	1,600	16	988	0.065 UD	0.060 UD	0.062 UD	0.086 UD	--
Acenapthylene	6.12	4,800	96	129	0.049 UD	0.045 UD	0.046 UD	0.064 UD	--
Acenapthene	4.9	4,800	96	129	0.054 UD	0.050 UD	0.051 UD	0.340 JDX	--
Fluorene	7.71	3,200	64	260	0.130 JD	0.026 UD	0.027 UD	0.038 UD	--
Phenanthrene	23.5	24,000	240	1,920	1.50 D	0.074 JD	0.062 UD	0.210 JDX	--
Anthracene	23.5	24,000	240	1,920	0.360 D	0.018 JD	0.016 UD	0.022 UD	--
Fluoranthene	49.1	3,200	64	18	1.9 D	0.100 JD	0.067 UD	2.00 DX	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33[b]	0.33[b]	0.390 DX	0.060 UD	0.062 UD	0.340 DX	--
Pyrene	68	2,400	48	192	1.90 D	0.130 JD	0.200 JD	1.10 DX	--
Benzo(a)anthracene	360	1.37	0.015[b]	0.015[b]	0.017 UD	0.068 JD	0.016 UD	0.023 UD	--
Chrysene	200	13.7	0.12	0.1	1.10 D	0.056 JD	0.120 JDX	2.50 D	--
Benzo(b)fluoranthene	880	1.37	0.015[b]	0.015[b]	0.830 DX	0.041 JDX	0.120 D	4.10 DX	--
Benzo(k)fluoranthene	2,020	1.37	0.015[b]	0.015[b]	1.20 D	0.023 JDX	0.020 UD	0.028 UD	--
Benzo(a)pyrene	5,500	0.137	0.015[b]	0.015[b]	0.035 UD	0.097 D	0.033 UD	0.046 UD	--
Dibenz(a,h)anthracene	1,790	1.37	0.03[b]	0.03[b]	0.060 UD	0.055 UD	0.057 UD	0.079 UD	--
Benzo(g,h,i)perylene	2,680	2,400	48	192	0.130 JDX	0.036 UD	0.037 UD	0.220 DX	--

[a] Soil cleanup levels in this table are obtained from Table B-4 and B-7 of Appendix B of the *100 Area Remedial Design Report/Remedial Action Work Plan* (100 Area RDR/RAWP) (DOE-RL 2009). Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 (ANL 2007) assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater. Nonradionuclide soil concentrations protective of groundwater and the river are based upon application of the "100 times" rule (Ecology 1996).

[b] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement Project Managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[e] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: bis(2-chloroethoxy)methane; surrogate: bis(2-chloroethyl)ether
Contaminant: chloro-3-methylphenol; 4-; surrogate: methylphenol; 3-
Contaminant: dichloroprop (pesticide); surrogate: dichlorophenoxyacetic acid; 2,4-; (2,4-D)
Contaminant: phenathrene; surrogate: anthracene

[f] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730(3)(a)(iii), 1996 [Method B for surface waters]).

[g] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

-- Not analyzed for, or not applicable.
B Analyte was found in the associated method blank as well as in the sample.
J Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
M Sample duplicate precision not met.
N Recovery exceeds upper or lower control limits
P This flag is used for an aroclor target analyte where there is greater than 25% difference for detected concentrations between the two gas chromatograph columns.
U Analyzed for but not detected.
X Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Soil Cleanup Level source: DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

^WCH Document Control

From: Faust, Toni L
Sent: Tuesday, August 02, 2011 9:35 AM
To: ^WCH Document Control
Subject: Please chron UPR-100-N-19, UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43 Bio-situ evaluation

Attachments: UPR-100-N-19 Ex-situ Bioremediation Evaluation 2.doc

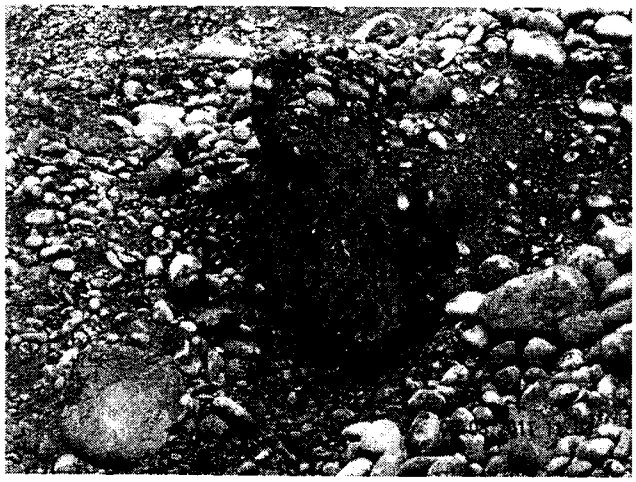
Please chron the attached documentation of the UPR-100-N-19, UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43 Waste Sites Ex-Situ Bioremediation Evaluation in compliance with CCN 157653 and electronically distribute to the following.

Mark Buckmaster
Jeff Walker
Dan Saueressig
Toni Faust

UPR-100-N-19
Ex-situ Bioremedi...

Thanks toni
100-N FR-D4 Project Interface

Waste Site Specific Evaluation

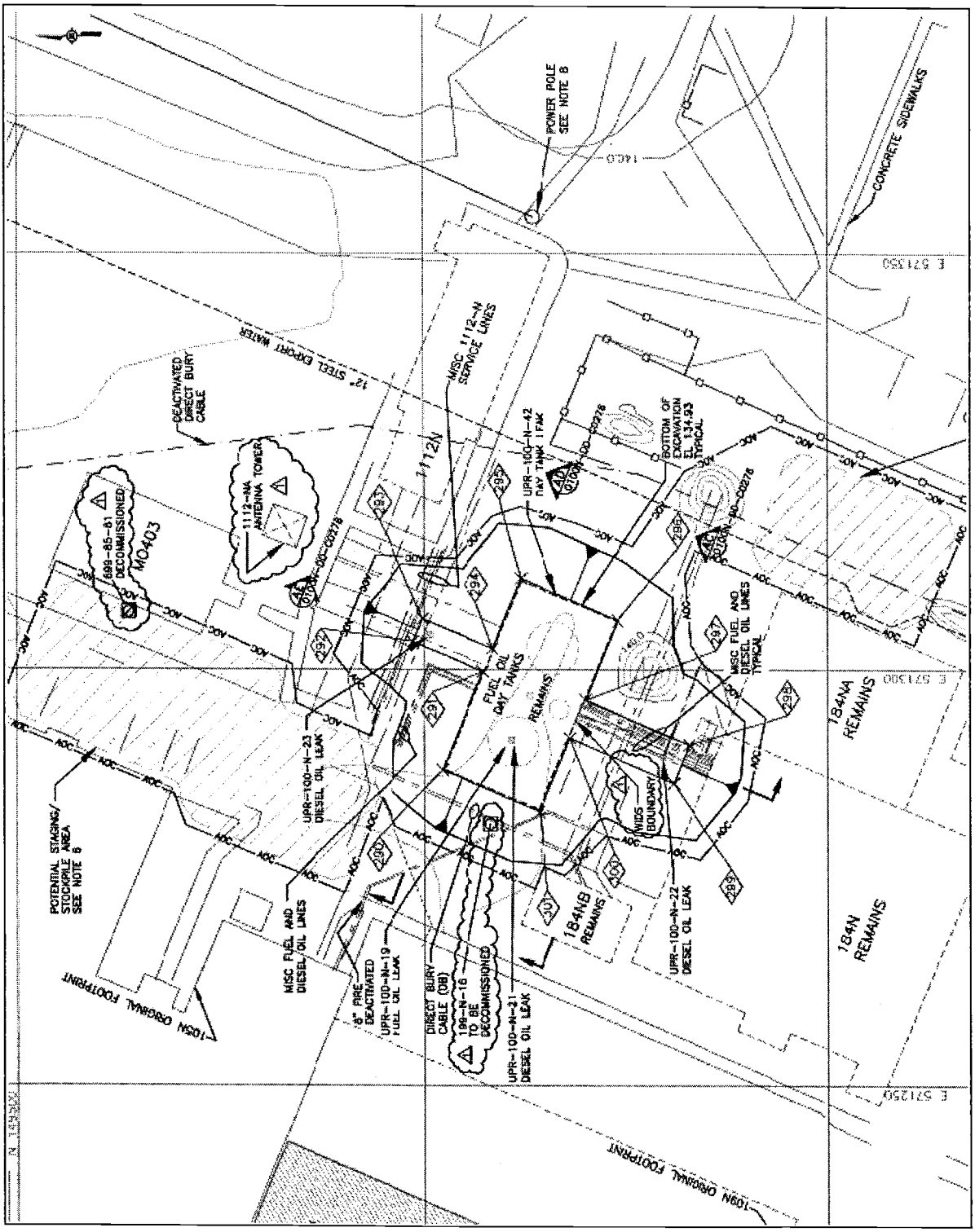
Waste Site:	UPR-100-N-19, UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43
Waste Description:	Waste site UPR-100-N-19 resulted from an unplanned release of No. 6 fuel oil in April 1984 at the 184- Fuel Oil Day Tank pad footprint. Collocated are smaller unplanned No. 6 fuel oil release waste sites UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43. All fuel oil was reportedly contained, removed, and disposed. Included in the scope of this plan. UPR-100-N-21 resulted from a failure of the tank-level annunciator causing an overfilling of the day tank during an oil transfer on April 25, 1986. UPR-100-N-22 resulted from a leak in the diesel oil supply line due to external corrosion on June 23, 1986. The line was excavated and rerouted. Oil-contaminated soil was removed. An adjacent groundwater well (N-16) was sampled and oil was detected in July 1986. Subsequently, residual oil was pumped from the groundwater through this monitoring well. UPR-100-N-23 resulted from a pipeline leak due to external corrosion on January 10, 1987. The leak was detected through inventory discrepancy. The line was isolated and excavated. Groundwater wells were sampled, and residual diesel oil was pumped from the groundwater. UPR-100-N-43 resulted from a pipeline leak at three locations between the 166-N and 184-N buildings at three different flange joints. The exact location of these flange joints is not given in historical documentation. The release was reported on April 26, 1989. Because of the above listed unplanned releases the UPR-100-N-19 waste site is located in the shallow zone (<15 feet below grade) with the UPR-100-N-42 waste site identified as the deep zone (15 feet below grade) waste site identified for in-situ bioremediation.
Sample Date:	June 8, 2011 (3 samples), June 14, 2011 (2 samples), June 18, 2011 (1 sample)
Sample Summary:	Two samples collected on June 8, 2011 were of waste matrix other than soil found during the site remediation J1JF73 = insulation, and J1JF78 = caulking. A sample was also collected of stained soil (J1JF74) (see photo below). On June 15th one sample (J1JVT0) was collected from inside the excavation near the edge of an asphalted area. Because asphalt is a petroleum based product the potential presence of the material in the sample made the sample not representative of the remaining waste site, however the data is included for completeness. Only the samples collected from the staging pile and the stained soil were used for comparison to the RAGs. 
Potential Candidate for ex-situ bioremediation	YES ____, NO X__

Waste Site Specific Evaluation

Summary:	Due to the amount of construction debris, concrete, piping, asbestos containing material, and metal (see photo below) the UPR-100-N-19 remediation produced a mixture of concentrated debris, rocks, and soil. Due to the amount of debris excavated with the soil, it is not technically feasible to sort the construction rubble (not suitable for ex-situ bioremediation) from the potentially contaminated soil without introducing smaller chunks of debris in to the soil to be potentially treated. 

WCH, 2011, Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites at 100-N, CCN-157653, Washington Closure Hanford, Richland Washington.

Figure 1. Excerpt from Approved UPR-100-N-19, UPR-100-N-21, UPR-100-N-22, UPR-100-N-23, and UPR-100-N-43 Remediation Design



Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (pCi/g)[a]			Sample results (pCi/g) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Radionuclides									
Ag (silver)-108m	2.38	--	--	--	--	--	--	--	--
Americium-241	32.1	--	--	0.0607 U	-0.00966 U	-0.0351 U	--	-0.0721 U	--
Carbon-14	8.69	--	--	--	--	--	--	--	--
Cesium-137	6.2	1,465	2,930	0.114	0.0107 U	-0.0148 U	--	0.0212 U	--
Cobalt-60	1.4	13,900	27,800	-0.0109 U	0.00904 U	-0.00000289 U	--	0.0248 U	--
Curium-243	22.1	--	--	--	--	--	--	--	--
Europium-152	3.3	--	--	-0.0316 U	0.00241 U	-0.0124 U	--	0.0374 U	--
Europium-154	3	--	--	-0.0106 U	0.0401 U	-0.0377 U	--	-0.0323 U	--
Europium-155	125	--	--	0.00106 U	0.0218 U	0.0546 U	--	0.00529 U	--
Iodine-129	0.25[b]	0.25[b]	0.25[b]	--	--	--	--	--	--
Neptunium-237	2.44	0.9	1.8	--	--	--	--	--	--
Nickel-63	4,013	83	166	--	--	--	--	--	--
Niobium-94	2.43	--	--	--	--	--	--	--	--
Plutonium-238	38.8	--	--	--	--	--	--	--	--
Plutonium-239/240	35.1	--	--	--	--	--	--	--	--
Potassium-40	16.6[c]	16.6[c]	16.6[c]	--	--	--	--	--	--
Radium-226	1.05	--	--	0.324	0.384	0.556	--	0.481	--
Radium-228	1.69	--	--	--	--	--	--	--	--
Strontium-90	4.5	27.6	55.2	0.109 U	0.0852 U	0.0298 U	--	0.00558 U	--
Technetium-99	5.8	0.46	0.92	--	--	--	--	--	--
Thorium-228	2.26	--	--	--	--	--	--	--	--
Thorium-230	2.96	--	--	--	--	--	--	--	--
Thorium-232	1.3[c]	--	--	--	--	--	--	--	--
Tritium (H-3) d	459	12.6	25.2	--	--	--	--	--	--
Uranium-233/234	1.1[c]	1.1[c]	1.1[c]	0.0271 U	0.533 U	0.0871 U	--	0.406	--
Uranium-235	0.61	0.5[b]	0.5[b]	-0.00136 U	-0.0377 U	-0.0104 U	--	-0.00185 U	--
Uranium-238	1.1[c]	1.1[c]	1.1[c]	0.244	0.257 U	0.131 U	--	0.184	--

Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Metals									
Antimony	32	5[c]	5[c]	0.36 U	0.37 U	0.42 U	1.6	0.35 U	--
Arsenic	20[c]	20[c]	20[c]	2.2	2.2	2.0	0.71 U	3.3	--
Barium	5,600	200	400	55.0	52.1	37.3	16.5	73.2	--
Beryllium	10.4[d]	1.51[c]	1.51[c]	0.031 U	0.032 U	0.037 U	0.035 U	0.11 B	--
Boron	7,200	320	--[g]	0.94 U	0.96 U	1.1 U	1.0 U	3.3	--
Cadmium	13.9[d]	0.81	0.81[c]	0.087 B	0.069 B	0.093 BM	0.044 U	0.16 B	--
Chromium, Total	80,000	18.5	18.5[c]	5.5 X	6.4 X	5.1 X	2.3 X	10.5 N	--
Chromium VI	2.1[d]	4.8	2	0.154 U	0.154 U	0.154 U	--	--	--
Cobalt	24	15.7[c]	--[g]	10.9	10.4	9.4 X	1.0BX[e]	8.9 X	--
Copper	2,960	59.2	22[c]	17.2	15.3	16.9	2.5	19.8	--
Lead	353	10.2[c]	10.2[c]	6.2	4.4	3.3	**14.4**	22.1 XM	GW, RP
Lithium	160	33.5[c]	--[g]	--	--	--	--	--	--
Manganese	3,760	512[c]	512[c]	295 X	273 X	268	108	334	--
Mercury	24	0.33[c]	0.33[c]	0.037	0.0052 U	0.0059 B	0.026	0.019	--
Methyl Mercury	8	0.16	0.16	--	--	--	--	--	--
Molybdenum	400	8	--[g]	0.25 U	0.26 U	0.52 B	0.28 U	0.58 B	--
Nickel	1,600	19.1[c]	27.4	8.2	10.4	12.7	4.6	28.5 X	--
Selenium	400	5	1	0.82 U	0.84 U	**1.3**	0.95 B	0.80 U	RP
Silver	400	8	0.73	0.15 U	0.16 U	0.18 U	0.17 U	0.15 U	--
Strontium	48,000	960	--[g]	--	--	--	--	--	--
Thallium	5.6	0.5[b]	0.5[b]	--	--	--	--	--	--
Tin	48,000	960	--[g]	--	--	--	--	--	--
Uranium (soluble salts)	240	3.21[c]	3.21[c]	--	--	--	--	--	--
Vanadium	560	85.1[c]	--[g]	61.8	62.0	55.1	10.5	81.2	--
Zinc	24,000	480	67.8[c]	45.7 X	37.6 X	39.8	13.5	139 XMN	--
TPH									
Diesel Range Organics (C10-C36)	200	200	200	59	**450 N**	**550 D**	--	310 N	--
Motor Oil (C10-C28)	200	200	200	42 B	**290 BN**	**4000 D**	--	76 N	--

Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Volatile Organics									
Acetone	72,000	720	--	0.00053 U	0.0051 U	0.0095 J	--	0.0053 U	--
Carbon Tetrachloride	7.69	0.0337	0.05	0.00062 U	0.00060 U	0.00064 UT	--	0.00063 U	--
Methylene Chloride	133	0.5	0.94	0.00073 U	0.0013 J	0.0022 JT	--	0.0017 JB	--
Toluene	6,400	64	1,360	0.00067 U	0.0010 J	0.00083 JT	--	0.00069 U	--
Xylene	16,000	160	--	0.00060 U	0.00058 U	0.011	--	0.00061 U	--
Semivolatiles									
Acenapthene	4,800	96	129	0.013 J	0.110 UD	0.000460 UD	--	0.040 J	--
Acenapthylene [e]	4,800	96	129	0.017 U	0.180 UD	0.770 UD	--	0.018 U	--
Anthracene	24,000	240	1,920	0.025 J	0.180 UD	1.300 JD	--	0.065 J	--
Benzo(a)anthracene	1.37	0.015[b]	0.015[b]	0.058 J	**0.210 UD**	**1.800 JD**	--	0.350	**GW, RP**
Benzo(a)pyrene	0.137	0.015[b]	0.015[b]	0.046 J	**0.210 UD**	**1.400 JD**	--	0.330 J	**GW, RP**
Benzo(b)fluoranthene	1.37	0.015[b]	0.015[b]	0.065 JK	0.0270 UD	**4.100 JD**	--	0.570 K	**GW, RP**
Benzo(k)fluoranthene	1.37	0.015[b]	0.015[b]	0.040 UK	**0.410 UD**	**1.800 UD**	--	0.041 UK	**GW, RP**
Benzo(g,h,i)perylene [e]	2,400	48	192	0.029 J	0.170 UD	1.400 JD	--	0.200 J	--
Bis(2-chloro-1-methylethyl) ether	14.3	0.33[b]	7.5	--	--	--	--	--	--
Bis(2-chloroethoxy)methane [e]	0.909	0.33[b]	0.33[b]	0.023 U	0.240 UD	**1.000 UD**	--	0.024 U	**GW, RP**
Bis(2-chloroethyl) ether	0.909	0.33[b]	0.33[b]	0.017 U	0.170 UD	**0.750 UD**	--	0.024	**GW, RP**
Bis(2-ethylhexyl)phthalate	71.4	0.6	0.36	0.079 JB	**0.740 JBD**	**2.100 UD**	--	0.210 JB	**GW, RP**
Bromophenylphenyl ether; 4-	--	--	--	0.019 U	0.200 UD	0.860 UD	--	0.020 U	--
Butylbenzylphthalate	16,000	320	250	0.043 U	0.450 UD	1.900 UD	--	0.044 JB	--
Carbazole	50	0.438	--	0.036 U	0.370 UD	**1.600 UD**	--	0.038 J	**GW**
Chloro-3-methylphenol; 4- [e]	4,000	80	--	0.067 U	0.680 UD	3.000 UD	--	0.068 U	--
Chloroanilene; 4-	320	6.4	--	0.083U	0.850 UD	3.700 UD	--	0.085 U	--
Chloronaphthalene; 2-	6,400	64	206	0.010 U	0.100 UD	0.450 UD	--	0.010 U	--
Chlorophenol;2-	400	4	19.34	0.021 U	0.220 UD	0.950 UD	--	0.022 U	--
Chlorophenylphenyl ether; 4-	--	--	--	0.021 U	0.220 UD	0.950 UD	--	0.022 U	--
Chrysene	13.7	0.12	0.1[b]	0.077 J	**0.280 UD**	**3.200 JD**	--	0.400	**GW, RP**
Dibenz(a,h)anthracene	1.37	0.03[b]	0.03[b]	0.016 U	**0.200 UD**	**0.860 UD**	--	0.020 U	**GW, RP**

Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Semivolatiles									
Dibenzofuran	160	3.2	--	0.020 U	0.210 UD	0.900 UD	--	0.021 U	--
Dichlorobenzene; 1,2-	7,200	60	540	0.022 U	0.230 UD	0.990 UD	--	0.023 U	--
Dichlorobenzene; 1,3-	2,400	24	80	0.012 U	0.120 UD	0.540 UD	--	0.012 U	--
Dichlorobenzene; 1,4-	41.7	0.33[b]	0.972	0.014 U	0.140 UD	0.610 UD	--	0.014 U	--
Dichlorobenzidine; 3,3-	2.22	0.33[b]	0.33[b]	0.091 U	**0.930 UD**	**4.100 UD**	--	0.093 U	GW, RP
Dichlorophenol; 2,4-	240	4.8	18.6	0.010 U	0.100 UD	0.450 UD	--	0.010 U	--
Diethylphthalate	64,000	1,280	4,600	0.026 U	0.270 UD	1.200 UD	--	0.027 U	--
Dimethylphthalate	80,000	1,600	14,400	0.023 U	0.240 UD	1.000 UD	--	0.024 U	--
Dimethylphenol; 2,4-	1,600	32	110.6	0.067 U	0.680 UD	3.000 UD	--	0.068 U	--
Di-n-butylphthalate	8,000	160	540	0.029 U	0.300 UD	1.300 UD	--	0.034 J	--
Di-n-octylphthalate	1,600	32	--	0.015 U	0.150 UD	0.650 UD	--	0.015 U	--
Dinitro-2-methylphenol; 4,6-	8	0.33[b]	--	0.330 U	**3.400 UD**	**15.000 UD**	--	0.340 U	GW
Dinitrophenol; 2,4-	160	3.2	14	0.340 U	**3.500 UD**	**15.00 UD**	--	0.340 U	GW
Dinitrotoluene; 2,4-	160	3.2	0.33[b]	0.067 U	**0.680 UD**	**3.000 UD**	--	0.068 U	GW
Dinitrotoluene; 2,6-	80	1.6	136	0.028 U	0.290 UD	1.300 UD	--	0.029 U	--
Ethylene glycol	160,000	320	--	--	--	--	--	--	--
Fluoranthene	3,200	64	18	0.076 J	0.370 UD	1.600 UD	--	0.640	--
Fluorene	3,200	64	260	0.018 U	0.190 UD	0.810 UD	--	0.024 U	--
Hexachlorobenzene	0.625	0.33[b]	0.33[b]	0.029 U	0.300 UD	**1.300 UD**	--	0.030	GW, RP
Hexachlorobutadiene	12.8	0.33[b]	0.33[b]	0.010 U	0.100 UD	**0.450 UD**	--	0.010	GW, RP
Hexachlorocyclopentadiene	480	5	48	0.050 U	0.520 UD	2.300 UD	--	0.052	--
Hexachloroethane	71.4	0.313	0.38	0.021 U	0.220 UD	**0.960 UD**	--	0.022	GW, RP
Hydrazine	0.333	0.33[b]	--	--	--	--	--	--	--
Indeno(1,2,3-cd) pyrene	1.37	0.33[b]	0.33[b]	0.022 U	0.230 UD	**0.990 UD**	--	0.170 J	GW, RP
Isophorone	1,050	9.21	1.68	0.017 U	0.180 UD	0.770 UD	--	0.018	--
Methylnaphthalene; 2-	320	3.2	--	0.040 J	0.200 UD	**3.500 JD**	--	0.020 U	GW
Methylphenol; 2- (cresol;o-)	4,000	80	--	0.013 U	0.130 UD	0.590 UD	--	0.013 U	--
Methylphenol; 4- (cresol;p-)	400	8	--	0.033 U	0.340 UD	1.500 UD	--	0.034 U	--
Naphthalene	1,600	16	988	0.031 U	0.320 UD	1.400 UD	--	0.032 U	--

Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Semivolatiles									
Nitroaniline; 2-	240	2.4	--	0.050 U	0.520 UD	2.300 UD	--	0.052 U	--
Nitroaniline; 3-	24	0.33[b]	--	0.074 U	**0.760 UD**	**3.300 UD**	--	0.075 U	GW
Nitroaniline; 4-	47.6	0.33[b]	--	0.073 U	**0.750 UD**	**4.400 UD**	--	0.075 U	GW
Nitrobenzene	160	1.6	3.4	0.022 U	0.230 UD	0.990 UD	--	0.023 U	--
Nitrophenol; 2-	--	--	--	0.010 U	0.100 UD	0.450 UD	--	0.010 U	--
Nitrophenol; 4-	640	12.8	1,254	0.098 U	1.0 UD	4.40 UD	--	0.100 U	--
Nitroso-di-n-propylamine;N-	0.33[b]	0.33[b]	0.33[b]	0.031 U	0.320 UD	**1.400 UD**	--	0.032 U	GW, RP
Nitrosodiphenylamine;N-	204	1.79	1.946	0.021 U	0.220 UD	0.950 UD	--	0.022 U	--
Pentachlorophenol	8.33	0.33[b]	0.33[b]	0.330 U	**3.400 UD**	**15.000 UD**	--	0.340 U	GW, RP
Phenanthrene	24,000	240	1,920	0.083 J	0.180 UD	4.000 JD	--	0.330 J	--
Phenol	24,000	480	4,200	0.018 U	0.190 UD	0.810 UD	--	0.019 U	--
Pyrene	2,400	48	192	0.140 J	0.130 UD	9.000 JBD	--	0.690 U	--
Tributyl Phosphate	185	3.3	--	--	--	--	--	--	--
Trichlorobenzene; 1,2,4-	800	7	45.4	0.028 U	0.290 UD	1.300 UD	--	0.029 U	--
Trichlorophenol; 2,4,5-	8,000	80	--	0.10 U	0.100 UD	0.450 UD	--	0.010 U	--
Trichlorophenol; 2,4,6-	90.9	0.795	0.42	0.010 U	0.100 UD	**0.450 UD**	--	0.010 U	RP
Pesticides and PCBs									
Aldrin	0.0588	0.00165[b]	0.00165[b]	0.00025 U	**0.024 UD**	**0.0056 UD**	--	0.00025 U	GW, RP
BHC, alpha	0.159	0.00165[b]	0.00165[b]	0.00021 U	**0.0021 UD**	**0.0048 UD**	--	0.00021 U	GW, RP
BHC, beta	0.556	0.00486	0.00554	0.00066 U	**0.0065 UD**	**0.015 UD**	--	0.00066 U	GW, RP
BHC, delta	--	--	--	0.00040 U	0.0039 UD	0.0090 UD	--	0.00040 U	GW, RP
BHC, gamma (Lindane)	0.769	0.00673	0.0038	0.00046 U	**0.0045 UD**	**0.010 UD**	--	0.00046 U	--
Chlordane (alpha, gamma)	2.86	0.025	0.0165	0.00032 U	0.0031 UD	0.0072 UD	--	0.00032 U	--
Dalapon	2,400	20	--				--	--	--
Db; 2,4-	640	12.8	--				--	--	--
DDD, 4,4'-	4.17	0.0365	0.0033[b]	0.00054 U	**0.0053 UD**	0.012 UD	--	0.00054 U	RP
DDE, 4,4'-	2.94	0.0257	0.0033[b]	0.00024 U	0.0023 UD	**0.0053 UD**	--	0.00024	RP
DDT, 4,4'-	2.94	0.0257	0.0033[b]	0.00058 U	**0.0057 UD**	**0.013 UD**	--	0.0059 UD	GW, RP

Waste Site Specific Evaluation

Contaminant	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
Pesticides and PCBs									
Dicambra	2,400	48	--	--	--	--	--	--	--
Dichlorophenoxyacetic acid; 2,4-	640	7	--	--	--	--	--	--	--
Dichloroprop [e]	640	7	--	--	--	--	--	--	--
Dichloroprop	640	7	--	--	--	--	--	--	--
Dieldrin	0.0625	0.0033 [b]	0.0033 [b]	0.00021 U	0.0020 UD	**0.0047 UD**	--	0.00021 U	GW, RP
Dinoseb (DNBP)	80	0.7	--	--	--	--	--	--	--
Endosulfan (I, II, sulfate)	480	9.6	0.0112	0.007 UN	0.0028 UD	0.0064 UD	--	0.00029 U	--
Endrin (and ketone, aldehyde)	24	0.2	0.039	0.030 U	0.0048 UD	0.016 JD	--	0.00049 UN	--
Heptachlor	0.222	0.002 [b]	0.002 [b]	0.00021 U	**0.0021 UD**	**0.0048 UD**	--	0.00021 U	GW, RP
Heptachlor epoxide	0.11	0.002 [b]	0.002 [b]	0.00042 U	**0.0041 UD**	**0.0095 UD**	--	0.00042 U	GW, RP
Methoxychlor	400	4	1.67	0.00044 U	0.0044 UD	0.010 UD	--	0.00045 U	--
MCPP [2-(2-Methyl-4-Chlorophenoxy) Propionic Acid]	80	10 [b]	164	--	--	--	--	--	--
Polychlorinated Biphenyls	0.5 [h]	0.017 [b]	0.017 [b]	--	--	--	--	--	--
PCB Aroclor-1016	0.5	0.017 [b]	0.017 [b]	0.0027 U	**0.0028 U**	**0.031 UD**	--	0.0027 U	GW, RP
PCB Aroclor-1221	0.5	0.017 [b]	0.017 [b]	0.0080 U	**0.0081 U**	**0.090 UD**	--	0.0079 U	GW, RP
PCB Aroclor-1232	0.5	0.017 [b]	0.017 [b]	0.0020 U	0.0020 U	**0.022 UD**	--	0.0020 U	GW, RP
PCB Aroclor-1242	0.5	0.017 [b]	0.017 [b]	0.0046 U	0.0047 U	**0.052 UD**	--	0.0046 U	GW, RP
PCB Aroclor-1248	0.5	0.017 [b]	0.017 [b]	0.0046 U	0.0047 U	**0.052 UD**	--	0.0046 U	GW, RP
PCB Aroclor-1254	0.5	0.017 [b]	0.017 [b]	0.0026 U	0.0026 U	**0.067 JPD**	--	0.067 P	GW, RP
PCB Aroclor-1260	0.5	0.017 [b]	0.017 [b]	0.0026 U	0.0061 J	**0.029 UD**	--	0.048 NP	GW, RP
Silvex (tp;2,4,5-)	640	5	--	--	--	--	--	--	--
Toxaphene	0.909	0.2 [b]	0.2 [b]	0.016 U	0.150 UD	**0.350 UD**	--	0.160 UD	GW, RP
Trichlorophenoxyacetic acid;2,4,5-	800	16	--	--	--	--	--	--	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier					
				J1JVR2	J1JVR3	J1JF74	J1JF78	J1JVT0	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Staging Pile Soil N 149736 E 571355	Staging Pile Area N 149749 E 571352	Stained Soil N 149429 E 571295	White, odorless material (possible silica/carbonate/sulfate) N 149423 E 571295	Near Asphalt in excavation N149715 E571347	Cleanup Level Exceeded
PAH									
Naphthalene	1,600	16	988	0.012 U	0.013 U	0.063 UD	--	0.012 U	--
Acenapthylene	4,800	96	129	0.0091 U	0.0095 U	0.048 UD	--	0.0094 U	--
Acenapthene	4,800	96	129	0.010 U	0.11 U	0.053 UD	--	0.010 U	--
Fluorene	3,200	64	260	0.0053 U	0.0056 U	0.028 UD	--	0.0055 U	--
Phenanthrene	24,000	240	1,920	0.030 J	0.050	2.500 DX	--	0.230	--
Anthracene	24,000	240	1,920	0.0070 J	0.014 J	0.016 UD	--	0.052 X	--
Fluoranthene	3,200	64	18	0.078	0.100	6.900 D	--	0.700	--
Indeno(1,2,3-cd) pyrene	1.37	0.33	0.33	0.024 J	0.013 U	0.063 UD	--	0.360 N	--
Pyrene	2,400	48	192	0.086	0.110	10.00 DX	--	0.470 X	--
Benzo(a)anthracene	1.37	0.015	0.015	**0.047**	0.0034 U	**16.00 DX**	--	0.460 X	D, GW, RP--
Chrysene	13.7	0.12	0.1	0.040	0.078	**6.300 DX**	--	0.380	GW, RP
Benzo(b)fluoranthene	1.37	0.015	0.015	**0.037**	**0.120 X**	**0.022 UD**	--	0.470 N	GW, RP
Benzo(k)fluoranthene	1.37	0.015	0.015	**0.025**	0.0042 U	**3.500 D**	--	0.160 XN	D, GW, RP
Benzo(a)pyrene	0.137	0.015	0.015	**0.053**	0.0068 U	**0.034 UD**	--	0.850 N	--
Dibenz(a,h)anthracene	1.37	0.03	0.03	0.011 U	0.012 U	**0.058 UD**	--	0.094 XN	GW, RP
Benzo(g,h,i)perylene	2,400	48	192	0.0089 JX	0.023 JX	0.038 UD	--	0.0075 U	--

[a] Soil cleanup levels in this table are obtained from Table B-4 and B-7 of Appendix B of the *100 Area Remedial Design Report/Remedial Action Work Plan* (100 Area RDR/RAWP) (DOE-RL 2009). Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 (ANL 2007) assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater. Nonradionuclide soil concentrations protective of groundwater and the river are based upon application of the "100 times" rule (Ecology 1996).

[b] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement Project Managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[e] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

[f] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: bis(2-chloroethoxy)methane; surrogate: bis(2-chloroethyl)ether
Contaminant: chloro-3-methylphenol; 4-; surrogate: methylphenol; 3-
Contaminant: dichloroprop (pesticide); surrogate: dichlorophenoxyacetic acid; 2,4-; (2,4-D)
Contaminant: phenathrene; surrogate: anthracene

[g] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730(3)(a)(iii), 1996 [Method B for surface waters]).

[h] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

-- Not analyzed for, or not applicable.
B Analyte was found in the associated method blank as well as in the sample.
J Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
M Sample duplicate precision not met.
N Recovery exceeds upper or lower control limits
P This flag is used for an aroclor target analyte where there is greater than 25% difference for detected concentrations between the two gas chromatograph columns.
U Analyzed for but not detected.
X Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Soil Cleanup Level source: DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

^WCH Document Control

From: Faust, Toni L
Sent: Thursday, July 28, 2011 9:17 AM
To: ^WCH Document Control
Subject: Please chron UPR-100-N-20 Bio-situ evaluation

Attachments: UPR-100-N-20 Ex-situ Bioremediation Evaluation-Final.doc

Please chron the attached documentation of the UPR-100-N-20 Waste Site Ex-Situ Bioremediation Evaluation in compliance with CCN 157653 and electronically distribute to the following.

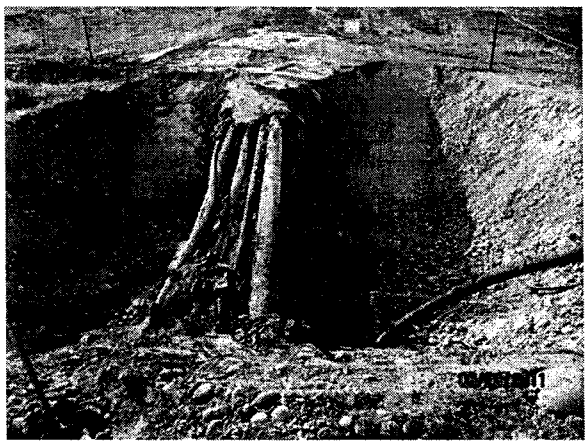
Mark Buckmaster
Jeff Walker
Dan Saueressig
Toni Faust

UPR-100-N-20
Ex-situ Bioremed...

Thanks toni
100-N FR-D4 Project Interface

Waste Site UPR-100-N-20 Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites
at 100-N Waste Site Specific Evaluation

Waste Site:	UPR 100-N-20, 166-N Two-inch Diesel Oil Return Line Leak
Waste Description:	The UPR-100-N-20 waste site located near Tank 1 in the 166-N Tank Farm is the result of a leak of Number 2 diesel oil from a 5-centimeter (2 inch) line due to external corrosion in June 1985. The pipeline was excavated and repaired, and isolation valve installed. Contaminated soil was removed for disposal.
In-Process Sample Dates:	June 28, 2011 (1 sample) and July 5, 2011 (3 samples)
Sample Summary:	On June 28, an in-process soil sample was collected from material inside the pipe chase within the UPR-100-N-20 waste site excavation. Three in-process samples were collected on July 5, 2011 from UPR-100-N-20 staging pile. The photos below show the open excavation and pipe chase constructed of fibrous material and a plastic barrier with waste sites 100-N-84:2 diesel oil pipelines and 100-N-84:4 steam pipelines. Sample J1JVW0 was collected from the stained area at around the pipelines at the side slope of the excavation.



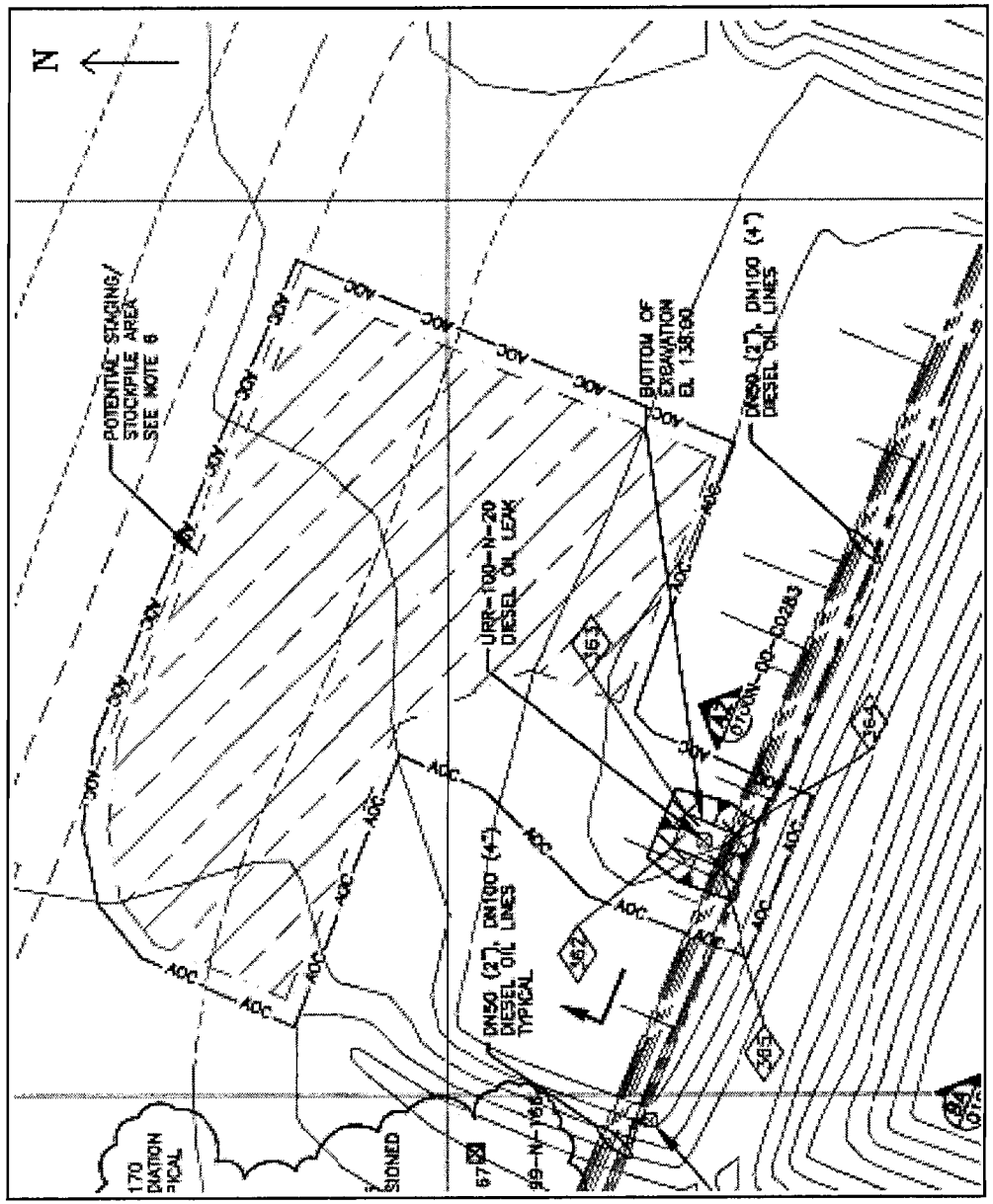
Potential Candidate for ex-situ bioremediation YES ____, NO _X__

A "NO" selection above will result in all remediated material disposed of appropriately with out treatment at the ERDF or other approved disposal facility.

Summary:	The UPR-100-N-20 waste site was excavated to a depth of 138.0 m exposing the 100-N-84:2 and 100-N-84:4 waste site pipelines within the remediation design. The 100-N-84:2 and 100-N-84:4 pipelines will be removed for disposal at the ERDF. Because the UPR-100-N-20 wastes site was previously remediated during the installation of an isolation valve the volume of soil excavated to remediate this site is less than 4 m^3. During excavation portions of the pipe chase construction material was exposed and loaded out with the soil. The UPR-100-N-20 soil stockpiled is a mixture of the fibrous and plastic pipe chase construction material which can not be technically segregated do its particle size. The volume of the debris (plastic and fiberous material) in the excavated soil make this waste site not suitable for ex-situ bioremediation.

WCH, 2011, Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites at 100-N, CCN-157653, Washington Closure Hanford, Richland Washington.

Figure 1. Excerpt from Approved upr-100-N-20 Remediation Design



Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (pCi/g)[a]			Sample results (pCi/g) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Radionuclides									
Ag (silver)-108m	90	2.38	--	--	--	--	--	--	--
Americium-241	200	32.1	--	--	-0.0381 U	0.0644 U	-0.0495 U	-0.0649 U	--
Carbon-14	200	8.69	--	--	--	--	--	--	--
Cesium-137	50	6.2	1,465	2,930	0.00160 U	-0.0198 U	0.0190 U	0.0574 U	--
Cobalt-60	50	1.4	13,900	27,800	0.00565 U	0.00139 U	0.00298 U	0.0401 U	--
Curium-243	200	22.1	--	--	--	--	--	--	--
Europium-152	200	3.3	--	--	0.0440 U	-0.0187 U	-0.0743 U	0.00235 U	--
Europium-154	200	3	--	--	-0.00366 U	-0.0703 U	-0.0432 U	0.00152 U	--
Europium-155	200	125	--	--	-0.00821 U	0.0358 U	-0.0372 U	0.0163 U	--
Iodine-129	1	0.25[b]	0.25[b]	0.25[b]	--	--	--	--	--
Neptunium-237	15	2.44	0.9	1.8	--	--	--	--	--
Nickel-63	30	4,013	83	166	--	--	--	--	--
Niobium-94	200	2.43	--	--	--	--	--	--	--
Plutonium-238	200	38.8	--	--	--	--	--	--	--
Plutonium-239/240	200	35.1	--	--	--	--	--	--	--
Potassium-40	5.5	16.6[c]	16.6[c]	16.6[c]	--	--	--	--	--
Radium-226	200	1.05	--	--	0.598	0.587	0.532	0.354	--
Radium-228	200	1.69	--	--		-	--	--	--
Strontium-90	25	4.5	27.6	55.2	0.0430 U	0.0226 U	-0.00267 U	0.0491 U	--
Technetium-99	0	5.8	0.46	0.92		--	--	--	--
Thorium-228	200	2.26	--	--		--	--	--	--
Thorium-230	200	2.96	--	--		-	-	-	--
Thorium-232	200	1.3[c]	--	--		-	-	-	--
Tritium (H-3)[d]	0	459	12.6	25.2		--	--	--	--
Uranium-233/234	2	1.1[c]	1.1[c]	1.1[c]	0.136	0.405	0.278	0.105	--
Uranium-235	2	0.61	0.5[b]	0.5[b]	0.0277 U	-0.00157 U	0.00	0.0517	--
Uranium-238	2	1.1[c]	1.1[c]	1.1[c]	0.165	0.312	0.139	0.182	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Metals									
Antimony	3.76	32	5 [c]	5 [c]	0.38 U	0.36 U	0.45 U	0.39 U	--
Arsenic	3	20 [c]	20 [c]	20 [c]	3.6	2.9	4.1	3.3	--
Barium	25	5,600	200	400	113	69.1	138	78.5	--
Beryllium	790	10.4 [d]	1.51 [c]	1.51 [c]	0.12 B	0.21	0.27	0.23	--
Boron	3	7,200	320	-- [g]	2.0	1.3 B	1.8 B	1.2 B	--
Cadmium	30	13.9 [d]	0.81 [c]	0.81 [c]	0.14 B	0.11 B	0.13 B	0.090 B	--
Chromium, Total	200	80,000	18.5 [c]	18.5 [c]	12.1	13.6	**24.8**	14.1	**GW, RP**
Chromium VI	0	2.1 [d]	4.8	2	--	--	--	--	--
Cobalt	50	24	15.7 [c]	-- [g]	6.8 X	6.1 X	8.2 X	8.2 X	--
Copper	22	2,960	59.2	22 [c]	16.1	14.8	16.2	15.2	--
Lead	30	353	10.2 [c]	10.2 [c]	4.0	3.9	6.3	6.4	--
Lithium	50	160	33.5 [c]	-- [g]	--	--	--	--	--
Manganese	50	3,760	512 [c]	512 [c]	276	266	309	321	--
Mercury	30	24	0.33 [c]	0.33 [c]	0.0056 UN	0.0052 U	0.0068	0.0055 U	--
Methyl Mercury	0.014	8	0.16	0.16	--	--	--	--	--
Molybdenum	20	400	8	-- [g]	0.29 B	0.25 B	0.31 U	0.26 U	--
Nickel	65	1,600	19.1 [c]	27.4	15.7	12.6	17.0	13.3	--
Selenium	5	400	5	1	0.86 U	0.81 U	1.0 U	0.87 U	--
Silver	90	400	8	0.73 [c]	0.16 U	0.15 U	0.19 U	0.16 U	--
Strontium	25	48,000	960	-- [g]	--	--	--	--	--
Thallium	71	5.6	0.5 [b]	0.5 [b]	--	--	--	--	--
Tin	130	48,000	960	-- [g]	--	--	--	--	--
Uranium (soluble salts)	2	240	3.21 [c]	3.21 [c]	--	--	--	--	--
Vanadium	1,000	560	85.1 [c]	-- [g]	37.0	36.7	46.0	49.0	--
Zinc	30	24,000	480	67.8 [c]	32.2 X	33.0	50.3	49.8	--
TPH									
Diesel Range Organics (C10-C36)	50	200	200	200	**15,000 BD**	**9,700 D**	**12,000 D**	300 U	**D, GW, RP**
Motor Oil (C10-C28)	50	200	200	200	**11,000 BD**	**9,600 D**	**12,000 D**	200 U	**D, GW, RP**

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Volatile Organics									
Acetone	0.0006	72,000	720	--	0.003 JD	0.013 J	0.013 J	0.0054 U	--
Carbon Tetrachloride	0.152	7.69	0.0337	0.05	0.0034 UD	0.0006 U	0.00068 U	0.00063 U	--
Methylene Chloride	0.01	133	0.5	0.94	0.019 JBD	0.0019 JB	0.0021 JB	0.0027 JB	--
Toluene	0.14	6,400	64	1,360	0.0062 JD	0.00066 U	0.00074 U	0.00069 UT	--
Xylene	0.233	16,000	160	--	0.620 D	0.0031 J	0.018	0.00061	--
Semivolatiles									
Acenapthene	4.9	4,800	96	129	2.90 JD	0.010 U	0.012 U	0.011 U	--
Acenapthylene[e]	6.12	4,800	96	129	0.74 UD	0.017 U	0.019 U	0.017 U	--
Anthracene	23.5	24,000	240	1,920	2.1 JD	0.017 U	0.019 U	0.017 U	--
Benzo(a)anthracene	360	1.37	0.015[b]	0.015[b]	**7.3 JD**	**0.610**	**0.059 J**	**0.180 J**	**D, GW, RP**
Benzo(a)pyrene	969	0.137	0.015[b]	0.015[b]	**11.0 JD**	**0.590**	**0.048 J**	**0.180 J**	**D, GW, RP**
Benzo(b)fluoranthene	803	1.37	0.015[b]	0.015[b]	**20 KD**	**1.30 K**	**0.140 JK**	**0.310 JK**	**D, GW, RP**
Benzo(k)fluoranthene	1,230	1.37	0.015[b]	0.015[b]	**1.7 UKD**	**0.040 UK**	**0.045 UK**	**0.041 UK**	**D, GW, RP**
Benzo(g,h,i)perylene[e]	2,680	2,400	48	192	5.4 JD	0.380	0.036 J	0.150 J	--
Bis(2-chloro-1-methylethyl) ether	0.0392	14.3	0.33[b]	7.5	--	--	--	--	--
Bis(2-chloroethoxy)methane[e]	0.00277	0.909	0.33[b]	0.33[b]	1.0 UD	0.023 U	0.026 U	0.024 U	--
Bis(2-chloroethyl) ether	0.0760	0.909	0.33[b]	0.33[b]	0.72 UD	0.017 U	0.019 U	0.017 U	--
Bis(2-ethylhexyl)phthalate	110	71.4	0.6	0.36	2.0 UD	**0.580 B**	**0.730 B**	0.098 JB	**GW, RP**
Bromophenylphenyl ether; 4-	4.16	--	--	--	0.830 UD	0.019 U	0.022 U	0.020 U	--
Butylbenzylphthalate	13.8	16,000	320	250	1.90 UD	0.043 U	0.049 U	0.044 U	--
Carbazole	3.39	50	0.438	--	1.60 UD	0.036 U	0.041 U	0.037 U	--
Chloro-3-methylphenol; 4-[f]	--	4,000	80	--	2.9 UD	0.066 U	0.075 U	0.068 U	--
Chloroanilene; 4-	0.0725	320	6.4	--	3.6 UD	0.082 U	0.093 U	0.084 U	--
Chloronaphthalene; 2-	2.98	6,400	64	206	0.44 UD	0.010 U	0.011 U	0.010 U	--
Chlorophenol;2-	0.388	400	4	19.34	0.910 UD	0.021 U	0.024 U	0.022 U	--
Chlorophenylphenyl ether; 4-	--	--	--	--	0.830 UD	0.021 U	0.024 U	0.022 U	--
Chrysene	200	13.7	0.12[b]	0.1[b]	**18 D**	**1.30**	**0.140 J**	**0.210 J**	**D, GW, RP**
Dibenz(a,h)anthracene	1,790	1.37	0.03[b]	0.03[b]	0.83 UD	0.019 U	0.022 U	0.020 U	--
Dibenzofuran	11.3	160	3.2	--	0.87 UD	0.020 U	0.023 U	0.021 U	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Semivolatiles									
Dichlorobenzene; 1,2-	0.379	7,200	60	540	0.96 UD	0.022 U	0.025 U	0.023 U	--
Dichlorobenzene; 1,3-	0.434	2,400	24	80	0.52 UD	0.012 U	0.014 U	0.012 U	--
Dichlorobenzene; 1,4-	0.616	41.7	0.33[b]	0.972	0.59 UD	0.014 U	0.015 U	0.014 U	--
Dichlorobenzidine; 3,3-	0.724	2.22	0.33[b]	0.33[b]	3.9 UD	0.090 U	0.100 U	0.092 U	--
Dichlorophenol; 2,4-	0.147	240	4.8	18.6	1.1 UD	0.010 U	0.011 U	0.010 U	--
Diethylphthalate	0.0820	64,000	1,280	4,600	2.9 UD	0.026 U	0.030 U	0.027 U	--
Dimethylphthalate	0.0371	80,000	1,600	14,400	1.1 JD	0.023 U	0.026 U	0.024 U	--
Dimethylphenol; 2,4-	0.209	1,600	32	110.6	2.9 UD	0.066 U	0.075 U	0.068 U	--
Di-n-butylphthalate	1.57	8,000	160	540	1.3 UD	0.029 U	0.033 U	0.030 U	--
Di-n-octylphthalate	83,200	1,600	32	--	0.63 UD	0.014 U	0.016 U	0.015 U	--
Dinitro-2-methylphenol; 4,6-	0.6015	8	0.33[b]	--	14 UD	0.330 U	0.380 U	0.340 U	--
Dinitrophenol; 2,4-	0.00001	160	3.2	14	14 UD	0.330 U	0.380 U	0.340 U	--
Dinitrotoluene; 2,4-	0.0955	160	3.2	0.33[b]	4.500 JD	0.066 U	0.075 U	0.068 U	--
Dinitrotoluene; 2,6-	0.0692	80	1.6	136	1.2 UD	0.014 U	0.032 U	0.029 U	--
Ethylene glycol	0.001	160,000	320	--	--	--	--	--	--
Fluoranthene	49.1	3,200	64	18	13 UD	1.60	0.041 U	0.150 J	--
Fluorene	7.71	3,200	64	260	3.2 UD	0.018 U	0.020 U	0.018 U	--
Hexachlorobenzene	80	0.625	0.33[b]	0.33[b]	1.3 UD	0.029 U	0.033 U	0.030 U	--
Hexachlorobutadiene	53.7	12.8	0.33[b]	0.33[b]	0.44 UD	0.010 U	0.011 U	0.010 U	--
Hexachlorocyclopentadiene	200	480	5	48	2.2 UD	0.050 U	0.057 U	0.051 U	--
Hexachloroethane	1.78	71.4	0.313	0.38	0.93 UD	0.021U	0.024 U	0.022 U	--
Hydrazine	0.0143	0.333	0.33[b]	--	--	--	--	--	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33[b]	0.33[b]	4.7 JD	0.290 J	0.034 J	0.077 J	--
Isophorone	0.0468	1,050	9.21	1.68	0.74 UD	0.017 U	0.019 U	0.017 U	--
Methylnaphthalene; 2-	2.98	320	3.2	--	**18 D**	**3.90**	--	0.020 U	**GW, RP**
Methylphenol; 2- (cresol;o)	0.434	4,000	80	--	0.57 UD	0.013 U	0.015 U	0.013 U	--
Methylphenol; 4- (cresol;p)	0.434	400	8	--	1.4 UD	0.033 U	0.038 U	0.034 U	--
Naphthalene	1.19	1,600	16	988	3.1 JD	0.031 U	4.70	0.032 U	--
Nitroaniline; 2-	0.0527	240	2.4	--	2.2 UD	0.050 U	0.057 U	0.051 U	--
Nitroaniline; 3-	0.0516	24	0.33[b]	--	3.2 UD	0.073 U	0.083 U	0.075 U	--

Waste Site UPR-100-N-20 Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites
at 100-N Waste Site Specific Evaluation

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Semivolatiles									
Nitroaniline; 4-	0.0516	47.6	0.33 [b]	--	3.2 UD	0.097 U	0.082 U	0.074 U	--
Nitrobenzene	0.191	160	1.6	3.4	0.96 UD	0.022 U	0.025 U	0.023 U	--
Nitrophenol; 2-	0.309	--	--	--	0.44 UD	0.010 U	0.011 U	0.010 U	--
Nitrophenol; 4-	0.309	640	12.8	1,254	4.2 UD	0.090 U	0.110 U	0.100 U	--
Nitroso-di-n-propylamine;N-	0.0240	0.33	0.33	0.33	1.3 UD	0.031 U	0.035 U	0.032 U	--
Nitrosodiphenylamine;N-	1.29	204	1.79	1.946	0.91 UD	**2.80**	0.024 U	0.022 U	**GW, RP**
Pentachlorophenol	0.592	8.33	0.33 [b]	0.33 [b]	14 UD	0.330 U	0.380 U	0.340 U	--
Phenanthrene [c]	23.5	24,000	240	1,920	13 JD	3.10 U	6.90	0.036 J	--
Phenol	0.0288	24,000	480	4,200	0.78 UD	0.018 U	0.020 U	0.018 U	--
Pyrene	68	2,400	48	192	29 D	3.50	0.910	0.210 J	--
Tributyl Phosphate	1.89	185	3.3 [b]	--	--	--	--	--	--
Trichlorobenzene; 1,2,4-	1.66	800	7	45.4	1.2 UD	0.028 U	0.032 U	0.029 U	--
Trichlorophenol; 2,4,5-	1.60	8,000	80	--	0.44 UD	0.010 U	0.011 U	0.010 U	--
Trichlorophenol; 2,4,6-	0.381	90.9	0.795	0.42	0.44 UD	0.010 U	0.011 U	0.010 U	--
Pesticides and PCBs									
Aldrin	48.7	0.0588	0.00165 [b]	0.00165 [b]	0.027 UD	0.0025 UD	0.003 UD	0.0026 UD	--
BHC, alpha	1.76	0.159	0.00165 [b]	0.00165 [b]	0.0023 UD	0.0021 UD	0.0026 UD	0.0022 UD	--
BHC, beta	2.14	0.556	0.00486	0.00554	0.0071 UD	0.0066 UD	0.0079 UD	0.0069 UD	--
BHC, delta	3.38	--	--	--	0.0043 UD	0.0040 UD	0.0048 UD	0.0041 UD	--
BHC, gamma (Lindane)	1.35	0.769	0.00673	0.0038	0.0051 JD	**0.023 D**	0.0055 UD	0.0048 UD	**GW, RP**
Chlordane (alpha, gamma)	51	2.86	0.025	0.0165 [b]	0.0056 JXD	0.014 JXD	0.0039 UD	0.0033 UD	--
Dalapon	0.00274	2,400	20	--	--	--	--	--	--
Db; 2,4-	0.1	640	12.8	--	--	--	--	--	--
DDD, 4,4'-	45.8	4.17	0.0365	0.0033 [b]	0.0058 UD	0.0055 UD	0.0065 UD	0.0056 UD	--
DDE, 4,4'-	86.4	2.94	0.0257	0.0033 [b]	0.0025 UD	0.043 XD	0.0078 JXD	0.0025 UD	--
DDT, 4,4'-	678	2.94	0.0257	0.0033 [b]	0.013 JXD	0.0059 UD	0.0070 UD	0.0064 JXD	--
Dicambra	0.0288	2,400	48	--	--	--	--	--	--
Dichlorophenoxyacetic acid; 2,4-	0.0294	640	7	--	--	--	--	--	--
Dichloroprop [c]	0.0294	640	7	--	--	--	--	--	--
Dieldrin	25.6	0.0625	0.0033 [b]	0.0033 [b]	0.0056 JXD	**0.022 D**	0.0033 JD	0.0022 UD	**GW, RP**

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
Pesticides and PCBs									
Dinoseb (DNBP)	3.54	80	0.7	--	--	--	--	--	--
Endosulfan (I, II, sulfate)	2.04	480	9.6	0.0112	**0.017 JD**	**0.024 XD**	0.0034 UD	0.0030 UD	**GW, RP**
Endrin (and ketone, aldehyde)	10.8	24	0.2	0.039	0.0052 UD	0.011 JXD	0.0058 UD	0.0032 UD	--
Heptachlor	9.53	0.222	0.002[b]	0.002[b]	0.0023 UD	**0.017 XD**	0.0026 UD	0.0022 UD	**GW, RP**
Heptachlor epoxide	83.2	0.11	0.002[b]	0.002[b]	**0.0048 JXD**	**0.014 JXD**	0.0051 UD	0.0044 UD	**GW, RP**
Methoxychlor	80	400	4	1.67	0.0098 JXD	0.0045 UD	0.0054 UD	0.0047 UD	--
MCPP [2-(2-Methyl-4-Chlorophenoxy) Propionic Acid]	48.5	80	10[b]	164	--	--	--	--	--
Polychlorinated Biphenyls	309	0.5[h]	0.017[b]	0.017[b]	--	--	--	--	--
PCB Aroclor-1016	107	0.5	0.017[b]	0.017[b]	0.003 U	0.014 UD	0.016 UD	0.0028 U	--
PCB Aroclor-1221	10.3	0.5	0.017[b]	0.017[b]	0.0087 U	0.040 UD	0.046 UD	0.0081 U	--
PCB Aroclor-1232	10.3	0.5	0.017[b]	0.017[b]	0.0022 U	0.0099 UD	0.012 UD	0.0020 U	--
PCB Aroclor-1242	44.8	0.5	0.017[b]	0.017[b]	0.0051 U	0.023 UD	0.027 UD	0.0047 U	--
PCB Aroclor-1248	43.9	0.5	0.017[b]	0.017[b]	0.0051 U	0.023 UD	0.027 UD	0.0047 U	--
PCB Aroclor-1254	75.6	0.5	0.017[b]	0.017[b]	0.0028 U	0.013 UD	0.015 UD	0.091 U	--
PCB Aroclor-1260	822	0.5	0.017[b]	0.017[b]	0.0028 UN	0.013 UD	0.015 UD	**0.033 P**	**GW, RP**
Silvex (tp;2,4,5-)	0.08	640	5	--	--	--	--	--	--
Toxaphene	95.8	0.909	0.2[b]	0.2[b]	0.17 UD	0.160 UD	0.190 UD	0.160 UD	--
Trichlorophenoxyacetic acid;2,4,5-	0.049	800	16	--	--	--	--	--	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW0 Material inside pipe chase N 149682 E 571309	J1JVW1 Staging area N 149712 E 571351	J1JVW2 Staging area N 149714 E 571349	J1JVW3 Staging area N 149715 E 571347	Cleanup Level Exceeded
PAH									
Naphthalene	1.19	1,600	16	988	0.33 UD	0.059 UD	4.00 DX	0.062 UD	--
Acenapthylene	6.12	4,800	96	129	0.25 UD	0.044 UD	0.055 UD	0.046 UD	--
Acenapthene	4.9	4,800	96	129	0.27 UD	0.049 UD	0.061 UD	0.052 UD	--
Fluorene	7.71	3,200 [v]	64	260	0.14 UD	0.026 UD	0.032 UD	0.027 UD [v]	--
Phenanthrene	23.5	24,000	240	1,920	0.33 UD	5.00 DX	0.074 UD	0.062 UD	--
Anthracene	23.5	24,000	240	1,920	0.083 UD	0.015 UD	0.019 UD	0.016 UD	--
Fluoranthene	49.1	3,200	64	18	15 D	0.064 UD	0.080 UD	0.083 JD	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33 [b]	0.33 [b]	**6.1 D**	**0.450 D**	0.074 UD	0.062 UD	**D, GW, RP**
Pyrene	68	2,400	48	192	25 DX	20.00 D	1.30 DX	0.093 JDX	--
Benzo(a)anthracene	360	1.37	0.015 [b]	0.015 [b]	0.087 UD	0.016 UD	0.020 UD	0.016 UD	--
Chrysene	200	13.7	0.12	0.1	**6.6 DX**	**0.560 DX**	0.030 UD	**0.120 JD**	**GW, RP**
Benzo(b)fluoranthene	880	1.37	0.015 [b]	0.015 [b]	0.11 UD	0.021 UD	0.026 UD	0.120 DX	--
Benzo(k)fluoranthene	2,020	1.37	0.015 [b]	0.015 [b]	3.9 DX	0.320 DX	0.110 DX	0.040 JDX	--
Benzo(a)pyrene	5,500	0.137	0.015 [b]	0.015 [b]	**17 D**	**0.660 DX**	**1.70 DX**	**0.210 DX**	**D, GW, RP**
Dibenz(a,h)anthracene	1,790	1.37	0.03 [b]	0.03 [b]	0.3 UD	0.054 UD	0.068 UD	0.057 UD	--
Benzo(g,h,i)perylene	2,680	2,400	48	192	4.4 D	0.300 D	0.044 UD	0.037 UD	--

[a] Soil cleanup levels in this table are obtained from Table B-4 and B-7 of Appendix B of the *100 Area Remedial Design Report/Remedial Action Work Plan* (100 Area RDR/RAWP) (DOE-RL 2009). Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 (ANL 2007) assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater. Nonradionuclide soil concentrations protective of groundwater and the river are based upon application of the "100 times" rule (Ecology 1996).

[b] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement Project Managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[e] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: bis(2-chloroethoxy)methane; surrogate: bis(2-chloroethyl)ether
Contaminant: chloro-3-methylphenol; 4-; surrogate: methylphenol; 3-
Contaminant: dichloroprop (pesticide); surrogate: dichlorophenoxyacetic acid; 2,4-; (2,4-D)
Contaminant: phenathrene; surrogate: anthracene

[f] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

[g] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730(3)(a)(iii), 1996 [Method B for surface waters]).

[h] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

-- Not analyzed for, or not applicable.
B Analyte was found in the associated method blank as well as in the sample.
D Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
J Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
K Benzo (b&k) fluoranthene are unresolved due to matrix, result is reported as Benzo(b fluoranthene.
N Recovery exceeds upper or lower control limits.
P This flag is used for an aroclor target analyte where there is greater than 25% difference for detected concentrations between the two gas chromatograph columns.
T Matrix spike and matrix spike duplicate; Recovery exceeds upper or lower control limits.
U Analyzed for but not detected.
X Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Soil Cleanup Level source: DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

^WCH Document Control

From: Faust, Toni L
Sent: Monday, August 15, 2011 2:52 PM
To: ^WCH Document Control
Subject: Please chron UPR-100-N-24 Bio-situ evaluation

Attachments: UPR-100-N-24 Ex-situ Bioremedation Evaluation.doc

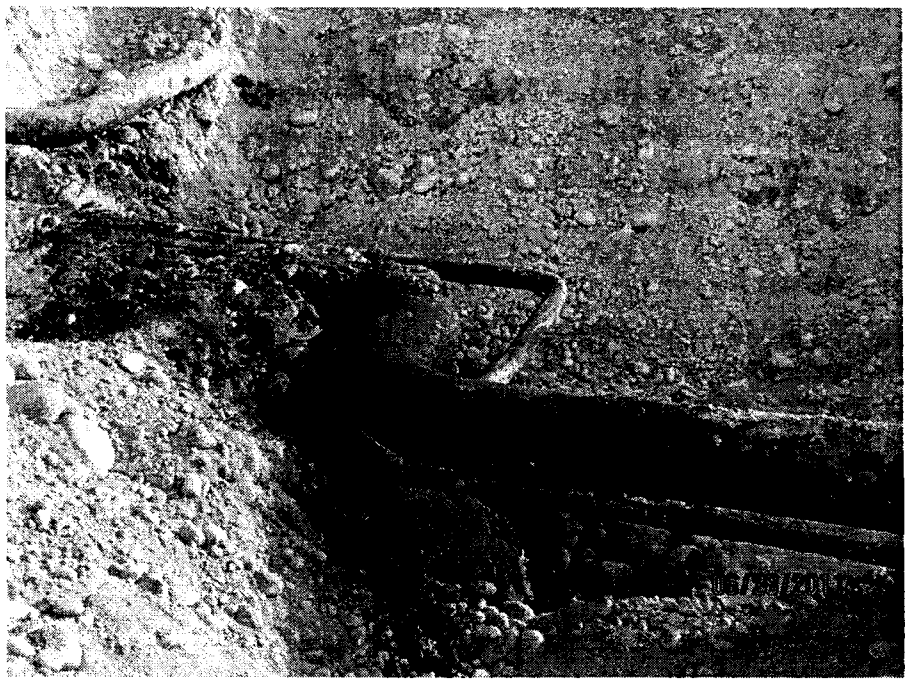
Please chron the attached documentation of the UPR-100-N-24 Waste Site Ex-Situ Bioremediation Evaluation in compliance with CCN 157653 and electronically distribute to the following.

Mark Buckmaster
Jeff Walker
Dan Saueressig
Toni Faust

UPR-100-N-24
Ex-situ Bioremeda...

Thanks toni
100-N FR-D4 Project Interface

Waste Site:	UPR 100-N-24, 166-N Fuel Oil Supply Line Leak
Waste Description:	The UPR-100-N-24 waste site resulted from the leaks of Number 6 fuel oil located near the 166-N Tank Farm. The leaks were scheduled for repair during the 1987 reactor shutdown.
In-Process Sample Dates:	June 27, 2011 (2 samples) and July 5, 2011 (2 samples)
Sample Summary:	Four in-process samples were collected as part of the UPR-100-N-24 waste site remediation. On June 27, 2011 during the remediation of UPR-100-N-24 a 100-N-84:2 pipeline was inadvertently nicked causing a spill of fuel oil to the ground within the open excavation. One in-process sample was collected of soil contaminated by this release. Coal ash used to pad the 100-N-84:2 steam pipelines and 100-N-84:4 fuel pipelines within the UPR-100-N-24 waste site was also sampled along with two soil samples from the UPR-100-N-24 staging pile. The photo below shows the open excavation, coal ash and pipelines.



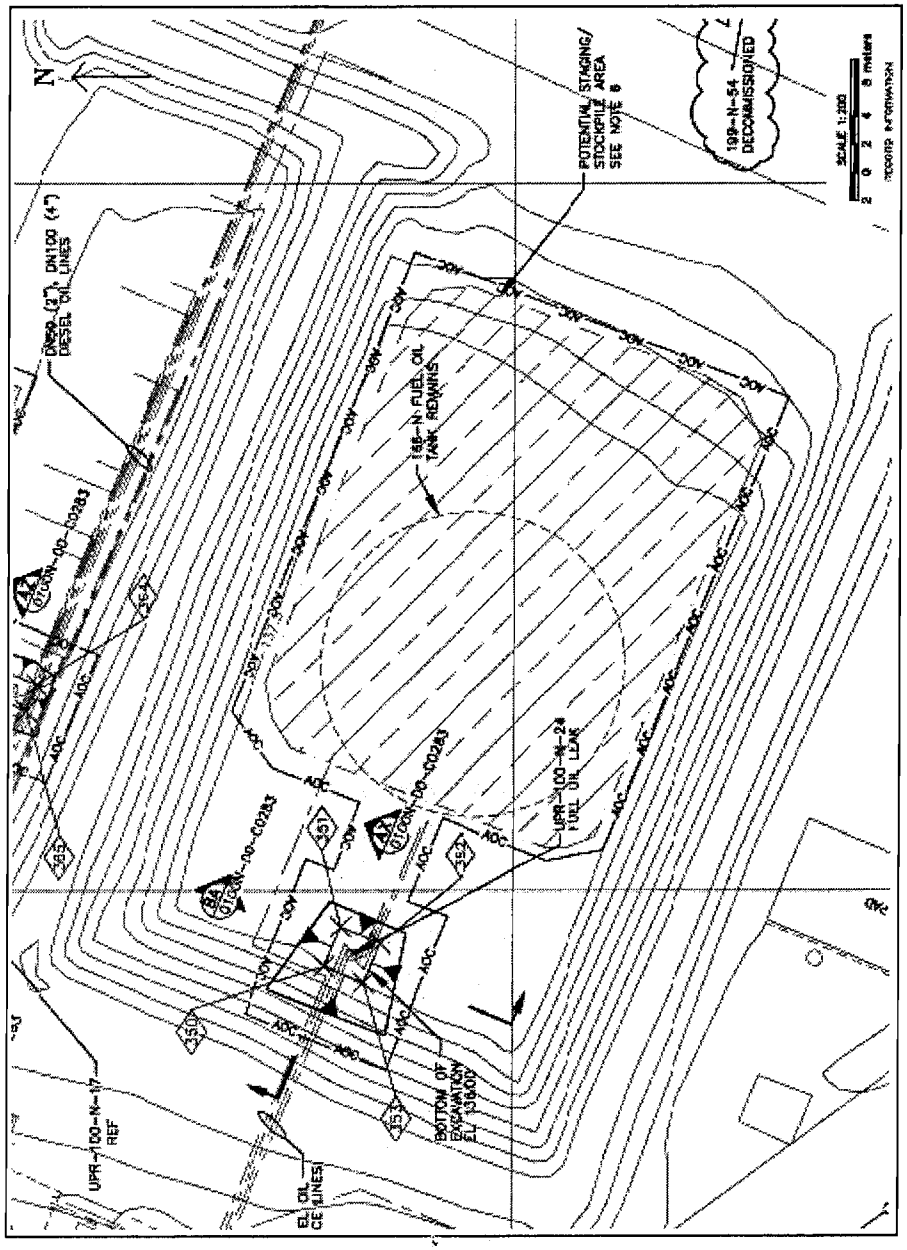
Potential Candidate for ex-situ bioremediation YES ____, NO _X__

A "NO" selection above will result in all remediated material disposed of appropriately with out treatment at the ERDF or other approved disposal facility.

Summary:	The UPR-100-N-24 waste site was generated as the result of a line leak which was scheduled for repair in 1987. No documentation of the repair showing the excavation of soil the waste site could be located. This lack of information along with the pipeline release on June 27, 2011 makes it unclear as to the source of the TPH found in the in-process samples. The TPH contamination is most due to the recent release because the sample material was wet from the release. Treatment of contaminated soil from the June 27, 2011 release is outside the scope of the ex-situ bioremediation treatment requirements in the interim ROD. The lack of metal contamination in the coal ash in-process sample results also indicate that this material may not be coal ash from a boiler but from some other material. This material is somewhat limited to the excavation and may not exist further along the pipeline. Because of the high levels of TPH this material will need to be removed to complete remediation of this waste site. The 100-N-84:2 and 100-N-84:4 pipelines within the excavation will also be removed for disposal at the ERDF. The UPR-100-N-24 soil stockpiled is a mixture of the "coal ash" material, soil and rocks. The effectiveness of ex-situ bioremediation of the "coal ash" material is not known. Because the TPH contamination found is due to the June 27, 2011 spill and the fine particle size of the "coal ash" material makes it technically not feasible of sorting/separation from the soil, the UPR-100-N-24 waste site material is not suitable for ex-situ bioremediation.

WCH, 2011, Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites at 100-N, CCN-157653, Washington Closure Hanford, Richland Washington.

Figure 1. Excerpt from Approved UPR-100-N-24 Remediation Design



Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (pCi/g)[a]			Sample results (pCi/g) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
Radionuclides									
Ag (silver)-108m	90	2.38	--	--	--	--	--	--	--
Americium-241	200	32.1	--	--	0.0184 U	-0.00991 U	-0.0949 U	-0.022 U	--
Carbon-14	200	8.69	--	--	--	--	--	--	--
Cesium-137	50	6.2	1,465	2,930	0.0221 U	0.0153 U	-0.000198 U	0.0044 U	--
Cobalt-60	50	1.4	13,900	27,800	-0.00974 U	0.0145 U	-0.014 U	0.00162 U	--
Curium-243	200	22.1	--	--	--	--	--	--	--
Europium-152	200	3.3	--	--	-0.0194 U	-0.0238 U	-0.0147 U	-0.00725 U	--
Europium-154	200	3	--	--	0.00159 U	0.0285 U	-0.0326 U	0.038 U	--
Europium-155	200	125	--	--	-0.00161 U	-0.0000903 U	-0.0616 U	0.0369 U	--
Iodine-129	1	0.25[b]	0.25[b]	0.25[b]	--	--	--	--	--
Neptunium-237	15	2.44	0.9	1.8	--	--	--	--	--
Nickel-63	30	4,013	83	166	--	--	--	--	--
Niobium-94	200	2.43	--	--	--	--	--	--	--
Plutonium-238	200	38.8	--	--	--	--	--	--	--
Plutonium-239/240	200	35.1	--	--	--	--	--	--	--
Potassium-40	5.5	16.6[c]	16.6[c]	16.6[c]	--	--	--	--	--
Radium-226	200	1.05	--	--	0.0242 U	-0.00996	0.397	0.435	--
Radium-228	200	1.69	--	--	--	--	--	--	--
Strontium-90	25	4.5	27.6	55.2	0.043 U	-0.00996 U	0.0606 U	0.136	--
Technetium-99	0	5.8	0.46	0.92	--	--	--	--	--
Thorium-228	200	2.26	--	--	--	--	--	--	--
Thorium-230	200	2.96	--	--	--	--	--	--	--
horium-232	200	1.3[c]	--	--	--	--	--	--	--
Tritium (H-3)	0	459	12.6	25.2	--	--	--	--	--
Uranium-233/234	2	1.1[c]	1.1[c]	1.1[c]	-0.00137 U	0.0612 U	0.246 U	0.143	--
Uranium-235	2	0.61	0.5	0.5	-0.00137 U	0.0 U	0.0307 U	0.0 U	--
Uranium-238	2	1.1[c]	1.1[c]	1.1[c]	0.0 U	0.187	0.211 U	0.0525 U	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
Metals									
Antimony	3.76	32	5[c]	5[c]	0.35 U	0.36 U	0.39 B	0.35 U	--
Arsenic	3	20	20[c]	20[c]	2.6	3.4	3.2	3.2	--
Barium	25	5,600	200	400	74.7	61.9	130	109	--
Beryllium	790	10.4[d]	1.51[c]	1.51[c]	0.030 U	0.067 B	0.23	0.23	--
Boron	3	7,200	320	--[f]	1.3 B	1.3 B	2.5	2.7	--
Cadmium	30	13.9[d]	0.81[c]	0.81[c]	0.038 U	0.087 B	0.11 B	0.11 B	--
Chromium, Total	200	80,000	18.5[c]	18.5[c]	1.2	11.9	18.3	21.8	--
Chromium VI	0	2.1[d]	4.8	2	--	--	0.155 U	0.155 U	--
Cobalt	50	24	15.7[c]	--[f]	10.3	8.1	10.8 X	9.3 X	--
Copper	22	2,960	59.2	22[c]	1.4	14.4	14.7	15.7	--
Lead	30	353	10.2[c]	10.2[c]	1.2	5.1	5.1	5.9	--
Lithium	50	160	33.5[c]	--[f]	--	--	--	--	--
Manganese	50	3,760	512[c]	512	22.9	273	285 X	306 X	--
Mercury	30	24	0.33[c]	0.33	0.0055 UN	0.0053 U	0.0057 U	0.0052 B	--
Methyl Mercury	0.014	8	0.16	0.16	--	--	--	--	--
Molybdenum	20	400	8	--[f]	2.4	0.25 U	0.89 B	0.34 B	--
Nickel	65	1,600	19.1[c]	27.4	**109 N**	12.6	**43.8 N**	**20.3**	**GW, RP**
Selenium	5	400	5	1	0.79 U	0.81 U	0.85 U	0.79 U	--
Silver	90	400	8	0.73	0.15 U	0.15 U	0.196 U	0.15 U	--
Strontium	25	48,000	960	--[f]	--	--	--	--	--
Thallium	71	5.6	0.5[b]	0.5[b]	--	--	--	--	--
Tin	130	48,000	960	--[f]	--	--	--	--	--
Uranium (soluble salts)	2	240	3.21	3.21[c]	--	--	--	--	--
Vanadium	1,000	560	85.1	--[f]	6.1	51.2	50.4	50.2	--
Zinc	30	24,000	480	67.8[c]	7.6	38.8	43.7	44.8	--
TPH									
Diesel Range Organics (C10-C36)	50	200	200	200	**21,000 D**	**99,000 BD**	**1,700**	**300 J**	**D, GWP, RP**
Motor Oil (C10-C28)	50	200	200	200	**11,000 D**	**78,000 BD**	**500 J**	**200 U**	**D, GWP, RP**

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg) [a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
Volatile Organics									
Acetone	0.0006	72,000	720	--	0.013 JD	0.850 UD	0.0071 J	0.045	--
Carbon Tetrachloride	0.152	7.69	0.0337	0.05	0.0012 UTD	0.036 UD	0.00060 U	0.00062 U	--
Methylene Chloride	0.01	133	0.5	0.94	0.0085 JTBD	0.150 UD	0.00071 U	0.00073 U	--
Toluene	0.14	6,400	64	1,360	0.0034 JTD	8.2 D	0.00065 U	0.00067 U	--
Xylene	0.233	16,000	160	--	0.0046 JD	29 D	0.00058 U	0.00060 U	--
Semivolatiles									
Acenapthene	4.9	4,800	96	129	59 UD	12.0	0.052 UD	0.051 UD	--
Acenapthylene [c]	6.12	4,800	96	129	100 UD	0.270 U	0.087 UD	0.085 UD	--
Anthracene	23.5	24,000	240	1,920	100 UD	19.0	0.560 JD	0.390 JD	--
Benzo(a)anthracene	360	1.37	0.015 [b]	0.015 [b]	120 UD	**50.0**	**0.430 JD**	**0.230 JD**	**GWP and RP**
Benzo(a)pyrene	969	0.137	0.015 [b]	0.015 [b]	120 UD	**19.0**	**0.180 JD**	**0.150 JD**	**D, GWP, RP**
Benzo(b)fluoranthene	803	1.37	0.015 [b]	0.015 [b]	150 UD	**19.0 K**	**0.370 JKD**	**0.270 JKD**	**D, GWP, RP**
Benzo(k)fluoranthene	1,230	1.37	0.015 [b]	0.015 [b]	230 UD	0.640 UK	0.200 UKD	0.200 UKD	**D, GWP, RP**
Benzo(g,h,i)perylene [c]	2,680	2,400	48	192	**94 UD**	11.0	0.240 JD	0.180 JD	**GWP**
Bis(2-chloro-1-methylethyl) ether	0.0392	14.3	0.33 [b]	7.5	--	--	--	--	--
Bis(2-chloroethoxy)methane [c]	0.00277	0.909	0.33 [b]	0.33 [b]	130 UD	0.370 U	0.120 UD	0.110 UD	--
Bis(2-chloroethyl) ether	0.0760	0.909	0.33 [b]	0.33 [b]	98 UD	**0.910 J**	0.085 UD	0.083 UD	**D, GWP, RP**
Bis(2-ethylhexyl)phthalate	110	71.4	0.6	0.36	41 JDE	0.730 U	0.470 JBD	0.390 JBD	--
Bromophenylphenyl ether; 4-	4.16	--	--	--	110 UD	0.30 U	0.097 UD	0.095 UD	--
Butylbenzylphthalate	13.8	16,000	320	250	250 UD	0.680 U	0.220 UD	0.210 UD	--
Carbazole	3.39	50	0.438	--	210 UD	5.10 J	0.180 UD	0.180 UD	--
Chloro-3-methylphenol; 4- [c]	--	4,000	80	--	390 UD	1.00 U	0.340 UD	0.330 UD	--
Chloroanilene; 4-	0.0725	320	6.4	--	490 UD	1.30 U	0.420 UD	0.410 UD	--
Chloronaphthalene; 2-	2.98	6,400	64	206	59 UD	0.160 U	0.051 UD	0.050 UD	--
Chlorophenol;2-	0.388	400	4	19.34	120 UD	0.330 U	0.110 UD	0.100 UD	--
Chlorophenylphenyl ether; 4-	--	--	--	--	120 UD	0.330 U	0.110 UD	0.100 UD	--
Chrysene	200	13.7	0.12	0.1 [b]	160 UD	**94.0**	**0.480 JD**	**0.260 JD**	**D, GWP, RP**
Dibenz(a,h)anthracene	1,790	1.37	0.03 [b]	0.03 [b]	110 UD	**7.0**	0.097 UD	0.095 UD	**D, GWP, RP**
Dibenzofuran	11.3	160	3.2	--	120 UD	**5.70**	0.110 JD	0.100 UD	**GWP**

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
Semivolatiles									
Dichlorobenzene; 1,2-	0.379	7,200	60	540	70 UD	0.350 U	0.110 UD	0.110 UD	--
Dichlorobenzene; 1,3-	0.434	2,400	24	80	80 UD	0.190 U	0.061 UD	0.060 UD	--
Dichlorobenzene; 1,4-	0.616	41.7	0.33[b]	0.972	130 UD	0.220 U	0.069 UD	0.068 UD	--
Dichlorobenzidine; 3,3-	0.724	2.22	0.33[b]	0.33[b]	530 UD	1.40 U	0.460 UD	0.450 UD	--
Dichlorophenol; 2,4-	0.147	240	4.8	18.6	59 UD	0.160 U	0.051 UD	0.050 UD	--
Diethylphthalate	0.0820	64,000	1,280	4,600	150 UD	0.370 U	0.130 UD	0.130 UD	--
Dimethylphthalate	0.0371	80,000	1,600	14,400	130 UD	0.370 U	0.120 UD	0.110 UD	--
Dimethylphenol; 2,4-	0.209	1,600	32	110.6	390 UD	1.0 U	0.340 UD	0.330 UD	--
Di-n-butylphthalate	1.57	8,000	160	540	170 UD	0.460 U	0.150 UD	0.140 UD	--
Di-n-octylphthalate	83,200	1,600	32	--	84 UD	0.230 U	0.073 UD	0.072 UD	--
Dinitro-2-methylphenol; 4,6-	0.6015	8	0.33[b]	--	1900 UD	5.20 U	1.70 UD	1.60 UD	--
Dinitrophenol; 2,4-	0.00001	160	3.2	14	1900 UD	5.30 U	1.70 UD	1.70 UD	--
Dinitrotoluene; 2,4-	0.0955	160	3.2	0.33[b]	390 UD	1.0 U	0.340 UD	0.330 UD	--
Dinitrotoluene; 2,6-	0.0692	80	1.6	136	160 UD	0.440 U	0.140 UD	0.140 UD	--
Ethylene glycol	0.001	160,000	320	--	--	--	--	--	--
Fluoranthene	49.1	3,200	64	18	210 UD	9.7	2.60 D	1.30 JD	--
Fluorene	7.71	3,200	64	260	110 UD	19.0	0.092 UD	0.090 UD	--
Hexachlorobenzene	80	0.625	0.33[b]	0.33[b]	170 UD	0.460 U	0.150 UD	0.140 UD	--
Hexachlorobutadiene	53.7	12.8	0.33[b]	0.33[b]	59 UD	0.160 U	0.051 UD	0.050 UD	--
Hexachlorocyclopentadiene	200	480	5	48	290 UD	0.790 U	0.250 UD	0.250 UD	--
Hexachloroethane	1.78	71.4	0.313	0.38	120 UD	0.340 U	0.110 UD	0.110 UD	--
Hydrazine	0.0143	0.333	0.33[b]	--	--	--	--	--	--
Isophorone	0.0468	1,050	9.21	1.68	100 UD	0.270 U	0.087 UD	0.085 UD	--
Methylnaphthalene; 2-	2.98	320	3.2	--	110 UD	0.90 U	0.097 UD	0.095 UD	--
Methylphenol; 2- (cresol;o)	0.434	4,000	80	--	76 UD	0.90 J	0.066 UD	0.065 UD	--
Methylphenol; 4- (cresol;p)	0.434	400	8	--	190 UD	1.30 J	0.170 UD	0.160 UD	--
Naphthalene	1.19	1,600	16	988	180 UD	**79.0**	0.160 UD	0.150 UD	**GWP**
Nitroaniline; 2-	0.0527	240	2.4	--	290 UD	0.79 U	0.250 UD	0.250 UD	--
Nitroaniline; 3-	0.0516	24	0.33[b]	--	430 UD	1.2 U	0.370 UD	0.360 UD	--
Nitroaniline; 4-	0.0516	47.6	0.33[b]	--	430 UD	1.2 U	0.370 UD	0.360 UD	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33[b]	0.33[b]	130 UD	0.350 U	0.110 UD	0.110 UD	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
Semivolatiles									
Nitrobenzene	0.191	160	1.6	3.4	130 UD	0.350 U	0.110 UD	0.110 UD	--
Nitrophenol; 2-	0.309	--	--	--	59 UD	0.160 U	0.051 UD	0.050 UD	--
Nitrophenol; 4-	0.309	640	12.8	1,254	570 UD	1.5 U	0.490 UD	0.480 UD	--
Nitroso-di-n-propylamine;N-	0.0240	0.33	0.33[b]	0.33[b]	180 UD	0.49 U	0.160 UD	0.150 UD	--
Nitrosodiphenylamine;N-	1.29	204	1.79	1.946	120 UD	0.330 U	0.110 UD	0.100 UD	--
Pentachlorophenol	0.592	8.33	0.33[b]	0.33[b]	1900 UD	5.2 U	1.70 UD	1.60 UD	--
Phenanthrene	23.5	24,000	240	1,920	100 UD	88.0	3.40 D	2.10 D	--
Phenol	0.0288	24,000	480	4,200	110 UD	1.30 J	0.092 UD	0.090 UD	--
Pyrene	68	2,400	48	192	70 UD	**67.0 T**	2.80 UD	1.30 JD	**GWP**
Tributyl Phosphate	1.89	185	3.3[b]	--	--	--	--	--	--
Trichlorobenzene; 1,2,4-	1.66	800	7	45.4	160 UD	0.440 U	0.140 UD	0.140 UD	--
Trichlorophenol; 2,4,5-	1.60	8,000	80	--	59 UD	0.160 U	0.051 UD	0.050 UD	--
Trichlorophenol; 2,4,6-	0.381	90.9	0.795	0.42	59 UD	0.160 U	0.051 UD	0.050 UD	--
Pesticides and PCBs									
Aldrin	48.7	0.0588	0.00165[b]	0.00165[b]	0.074 UD	0.0026 UD	0.0026 UD	0.0025 UD	--
BHC, alpha	1.76	0.159	0.00165[b]	0.00165[b]	0.063 UD	0.0022 UD	0.0022 UD	0.0022 UD	--
BHC, beta	2.14	0.556	0.00486	0.00554	0.20 UD	0.0068 UD	0.0068 UD	0.0067 UD	--
BHC, delta	3.38	--	--	--	0.12 UD	0.0041 UD	0.0041 UD	0.0041 UD	--
BHC, gamma (Lindane)	1.35	0.769	0.00673	0.0038	0.14 UD	0.0048 UD	0.0047 UD	0.0047 UD	--
Chlordane (alpha, gamma)	51	2.86	0.025	0.0165	0.096 UD	0.0027 UD	0.0033 UD	0.0033 UD	--
Dalapon	0.00274	2,400	20	--	--	--	--	--	--
Db; 2,4-	0.1	640	12.8	--	--	--	--	--	--
DDD, 4,4'-	45.8	4.17	0.0365	0.0033[b]	0.160 UD	0.0056 UD	0.0056 UD	0.0055 UD	--
DDE, 4,4'-	86.4	2.94	0.0257	0.0033[b]	0.070 UD	0.0024 UD	0.0024 UD	0.0024 UD	--
DDT, 4,4'-	678	2.94	0.0257	0.0033[b]	0.170 UD	0.0060 UD	**0.056 XD**	**0.0065 JXD**	**GWP, RP**
Dicambra	0.0288	2,400	48	--	--	--	--	--	--
Dichlorophenoxyacetic acid; 2,4-	0.0294	640	7	--	--	--	--	--	--
Dichloroprop	0.0294	640	7	--	--	--	--	--	--
Dieldrin	25.6	0.0625	0.0033[b]	0.0033[b]	--	--	--	--	--

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Pesticides and PCBs									
Dinoseb (DNBP)	3.54	80	0.7	--	--	--	--	--	--
Endosulfan (I, II, sulfate)	2.04	480	9.6	0.0112	0.085 UD	0.0029 UD	0.0029 UD	0.0029 UD	--
Endrin (and ketone, aldehyde)	10.8	24	0.2	0.039	0.140 UD	**0.068 D**	0.005 UD	0.0049 UD	**RP**
Heptachlor	9.53	0.222	0.002[b]	0.002[b]	0.063 UD	0.0022 UD	0.0022 UD	0.0022 UD	--
Heptachlor epoxide	83.2	0.11	0.002[b]	0.002[b]	0.130 UD	0.0044 UD	**0.014 JXD**	0.0043 UD	**GWP, RP**
Methoxychlor	80	400	4	1.67	0.130 UD	0.0046 UD	0.0046 UD	0.0045 UD	--
MCPP [2-(2-Methyl-4-Chlorophenoxy) Propionic Acid]	48.5	80	10[b]	164	--	--	--	--	--
Polychlorinated Biphenyls	309	0.5[g]	0.017[b]	0.017[b]	--	--	--	--	--
PCB Aroclor-1016	107	0.5	0.017[b]	0.017[b]	0.005 U	0.015 UD	0.052 UD	0.014 UD	--
PCB Aroclor-1221	10.3	0.5	0.017[b]	0.017[b]	0.015 U	0.042 UD	0.150 UD	0.040 UD	--
PCB Aroclor-1232	10.3	0.5	0.017[b]	0.017[b]	0.005 U	0.011 UD	0.038 UD	0.0099 UD	--
PCB Aroclor-1242	44.8	0.5	0.017[b]	0.017[b]	0.009 U	0.025 UD	0.088 UD	0.023 UD	--
PCB Aroclor-1248	43.9	0.5	0.017[b]	0.017[b]	0.0055 U	0.025 UD	0.088 UD	0.023 UD	--
PCB Aroclor-1254	75.6	0.5	0.017[b]	0.017[b]	0.0054 U	0.014 UD	0.990 D	0.260 D	--
PCB Aroclor-1260	822	0.5	0.017[b]	0.017[b]	0.0026 U	0.014 UD	0.670 D	0.190 D	--
Silvex (tp;2,4,5-)	0.08	640	5	--	--	--	--	--	--
Toxaphene	95.8	0.909	0.2	0.2	4.70 UD	0.160 UD	0.160 UD	0.160 UD	--
Trichlorophenoxyacetic acid;2,4,5-	0.049	800	16	--	--	--	--	--	--
PAH									
Naphthalene	1.19	1,600	16	988	1.80 UD	**110 D**	0.058 UD	0.057 UD	**GWP**
Acenapthylene	6.12	4,800	96	129	1.40 UD	1.50 JD	0.044 UD	0.043 UD	--
Acenapthene	4.9	4,800	96	129	1.50 UD	0.480 UD	0.048 UD	0.048 UD	--
Fluorene	7.71	3,200	64	260	0.80 UD	0.260 UD	0.026 UD	0.035 JDX	--
Phenanthrene	23.5	24,000	240	1,920	25.0 D	78.0 DX	5.50 D	2.40 D	--
Anthracene	23.5	24,000	240	1,920	2.90 JD	0.150 UD	0.70 D	0.480 D	--

Contaminant	K_d Value (mL/g)	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
		Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	J1JVW4 Coal Ash N 149661 E 571295	J1JVW5 Fuel Spill Contaminated soil N 149661 E 571295	J1JVW6 Staging pile soil N 149717 E 571340	J1JVW7 Staging pile soil N 149721 E 571335	Cleanup Level Exceeded
PAH									
Fluoranthene	49.1	3,200	64	18	5.40 JD	37.0 DX	4.80 D	1.90 D	--
Indeno(1,2,3-cd) pyrene	3,470	1.37	0.33	0.33	1.80 UD	0.580 UD	0.180 XD	0.140 DX	--
Pyrene	68	2,400	48	192	1.80 UD	67.0 DX	4.50 D	1.70 D	--
Benzo(a)anthracene	360	1.37	0.015	0.015	0.480 UD	**190 DX**	**1.80 DX**	**0.760 D**	**GWP and RP**
Chrysene	200	13.7	0.12	0.1	0.730 UD	**110 DX**	**1.30 D**	**0.630 D**	**GWP and RP**
Benzo(b)fluoranthene	880	1.37	0.015	0.015	**11.00 D**	0.20 UD	**1.30 D**	**0.680 D**	**D, GWP, RP**
Benzo(k)fluoranthene	2,020	1.37	0.015	0.015	**3.50 DX**	**17.0 DX**	**0.570 DX**	**0.320 DX**	**D, GWP, RP**
Benzo(a)pyrene	5,500	0.137	0.015	0.015	0.970 UD	0.310 UD	0.031 UD	0.031 UD	--
Dibenz(a,h)anthracene	1,790	1.37	0.03	0.03	1.70 UD	0.530 UD	0.053 UD	0.052 UD	--
Benzo(g,h,i)perylene	2,680	2,400	48	192	1.10 UD	0.350 UD	0.035 UD	0.053 JDX	--

[a] Soil cleanup levels in this table are obtained from Table B-4 and B-7 of Appendix B of the *100 Area Remedial Design Report/Remedial Action Work Plan* (100 Area RDR/RAWP) (DOE-RL 2009). Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 (ANL 2007) assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater. Nonradionuclide soil concentrations protective of groundwater and the river are based upon application of the "100 times" rule (Ecology 1996).

[b] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement Project Managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[e] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: bis(2-chloroethoxy)methane; surrogate: bis(2-chloroethyl)ether
Contaminant: chloro-3-methylphenol; 4-; surrogate: methylphenol; 3-
Contaminant: dichloroprop (pesticide); surrogate: dichlorophenoxyacetic acid; 2,4-; (2,4-D)
Contaminant: phenathrene; surrogate: anthracene

[f] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730(3)(a)(iii), 1996 [Method B for surface waters]).

[g] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

-- Not analyzed for, or not applicable.
B Analyte was found in the associated method blank as well as in the sample.
J Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
M Sample duplicate precision not met.
N Recovery exceeds upper or lower control limits
P This flag is used for an aroclor target analyte where there is greater than 25% difference for detected concentrations between the two gas chromatograph columns.
U Analyzed for but not detected.
X Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Soil Cleanup Level source: DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

^WCH Document Control

From: Faust, Toni L
Sent: Tuesday, August 02, 2011 10:31 AM
To: ^WCH Document Control
Subject: RE: Please chron UPR-100-N-36 Bio-situ evaluation

Attachments: UPR-100-N-36 Ex-situ Bioremediation Evaluation.doc

Please chron the attached documentation of the UPR-100-N-36 Waste Site Ex-Situ Bioremediation Evaluation in compliance with CCN 157653 and electronically distribute to the following.

Mark Buckmaster
Jeff Walker
Dan Saueressig
Toni Faust

UPR-100-N-36
Ex-situ Bioremedi...

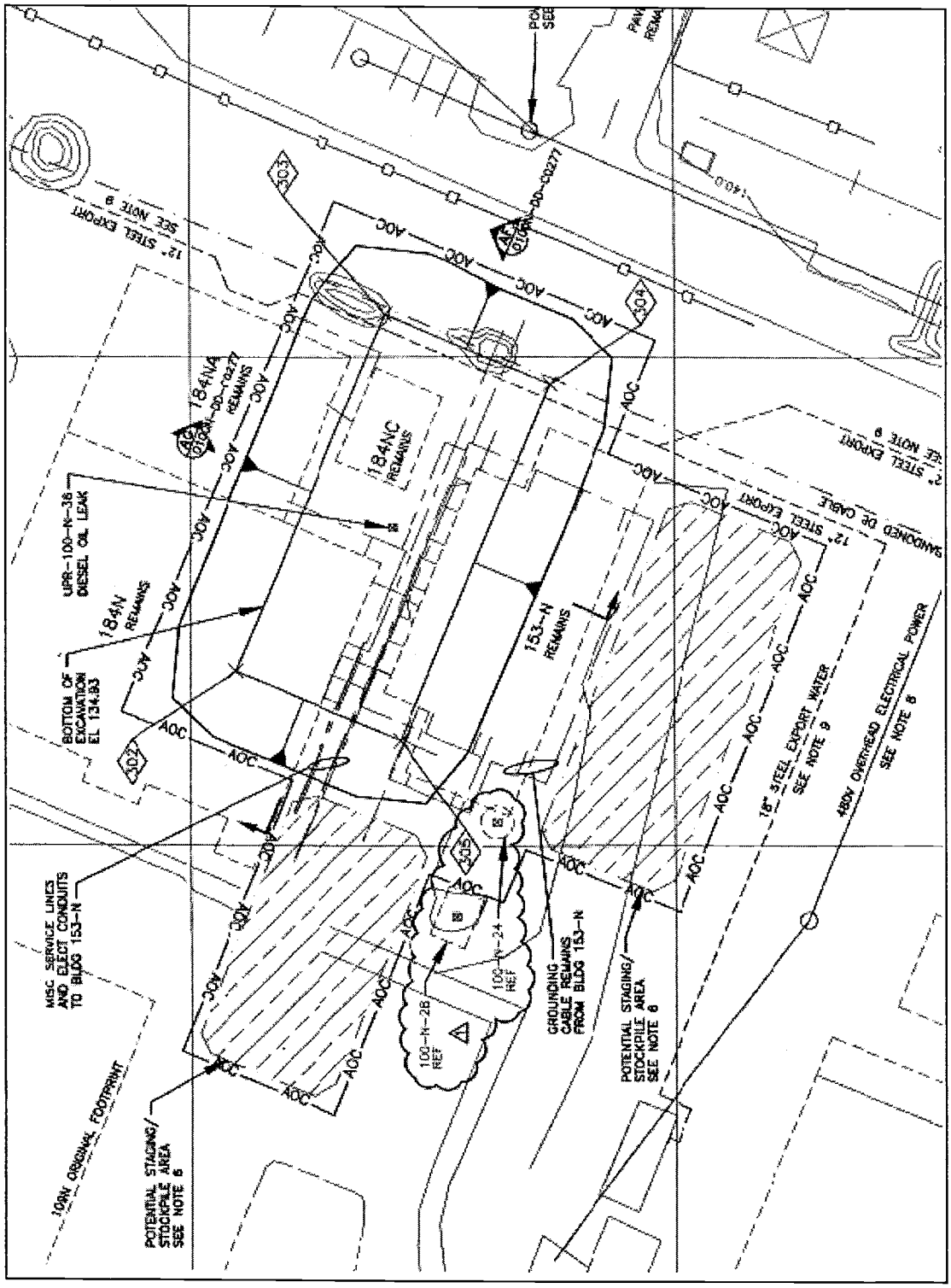
Thanks toni
100-N FR-D4 Project Interface

Waste Site UPR-100-N-36 Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum
Waste Sites at 100-N Waste Site Specific Evaluation

Waste Site:	UPR-100-N-36
Waste Description:	The UPR-100-N-36 waste site resulted from numerous spills of diesel fuel and motor oil used for normal operations and maintenance occurred over a 13 year period when the area was used as a diesel air compressor staging area located between the 153N and 184N buildings. During excavation between 184-N and 153-N strong smell of petroleum was noted. The approximately 3,333 m^3 area was designated as UPR-100-N-36 and identified for remove, treat and dispose.
Sample Date:	May 31, 2011 (3 samples) and June 14, 2011 (1 sample)
Sample & Remediation Summary:	Three in-process samples were collected on May 31, 2011 including one from the stained soil and one from a hardened black material (see photo below) discovered during excavation of UPR-100-N-36. A forth soil in-process sample (HEIS # J1JCF9) was collected from soil placed in the staging pile area. 
Potential Candidate for ex-situ bioremediation	YES ____, NO __X__
Summary:	Because the UPR-100-N-36 wastes site is collocated with the 153-N and 183N building foundations and waste site pipelines 100-N-61, 100-N-84:1 100-N-84:3 and 100-N-103:1 a large amount of debris was removed along with the soil. The pipelines and larger pieces of concrete foundation were removed for disposal at the ERDF. The UPR-100-N-36 soil stockpiled contains a mixture of the black material represented by in-process sample J1JCH2. The analytical results this material presents the only source of petroleum product contamination above the RAG within the UPR-100-N-36 waste site remediation boundary. Because of the hardness of the material it is technically unsuitable for ex-situ bioremediation. Additionally this material is of limited quantity in the soil removed from the UPR-100-N-36 waste site resulting in this site being identified as not requiring ex-situ bioremediation.

WCH, 2011, Phase 1 Ex-Situ Bioremediation Plan for Shallow Petroleum Waste Sites at 100-N, CCN-157653, Washington Closure Hanford, Richland Washington.

Figure 1. Excerpt from Approved UPR-100-N-36 Remediation Design



Contaminant	Soil Cleanup Levels (pCi/g)[a]			Sample results (pCi/g) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Radionuclides								
Ag (silver)-108m	2.38	--	--	--	--	--	--	--
Americium-241	32.1	--	--	-0.00113 U	0.0245 U	-0.0489 U	-0.0182 U	--
Carbon-14	8.69	--	--	--	--	--	--	--
Cesium-137	6.2	1,465	2,930	-0.00531 U	-0.000265 U	-0.0163 U	0.00430 U	--
Cobalt-60	1.4	13,900	27,800	-0.00578 U	0.000508 U	0.00888 U	0.0421 U	--
Curium-243	22.1	--	--	--	--	--	--	--
Europium-152	3.3	--	--	0.0117 U	-0.00589 U	-0.0210 U	-0.0449 U	--
Europium-154	3	--	--	-0.0125 U	0.0106 U	0.0442 U	0.00601 U	--
Europium-155	125	--	--	0.0276 U	0.00347 U	0.00682 U	0.0386 U	--
Iodine-129	0.25[b]	0.25[b]	0.25[b]	--	--	--	--	--
Neptunium-237	2.44	0.9	1.8	--	--	--	--	--
Nickel-63	4,013	83	166	--	--	--	--	--
Niobium-94	2.43	--	--	--	--	--	--	--
Plutonium-238	38.8	--	--	--	--	--	--	--
Plutonium-239/240	35.1	--	--	--	--	--	--	--
Potassium-40	16.6[c]	16.6[c]	16.6[c]	--	--	--	--	--
Radium-226	1.05	--	--	0.363 U	0.336 U	0.675	0.321	--
Radium-228	1.69	--	--	--	--	--	--	--
Strontium-90	4.5	27.6	55.2	-0.0278 U	-0.0287 U	0.0325 U	0.0362 U	--
Technetium-99	5.8	0.46	0.92	--	--	--	--	--
Thorium-228	2.26	--	--	--	--	--	--	--
Thorium-230	2.96	--	--	--	--	--	--	--
Thorium-232	1.3	--	--	--	--	--	--	--
Tritium (H-3)[d]	459	12.6	25.2	--	--	--	--	--
Uranium-233/234	1.1[c]	1.1[c]	1.1[c]	0.0114 U	0.0734 U	0.122 U	0.180	--
Uranium-235	0.61	0.5[b]	0.5[b]	-0.0131 U	0.00 U	-0.00153 U	-0.00130 U	--
Uranium-238	1.1[c]	1.1[c]	1.1[c]	0.167 U	0.0734 U	0.0902 U	0.309	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Metals								
Antimony	32	5[c]	5[c]	0.37 U	0.37 U	0.36 U	0.39 U	--
Arsenic	20[c]	20[c]	20[c]	2.0	1.3	2.4	1.8	--
Barium	5,600	200	400	49.8 X	43.1 X	47.6 X	56.1 XM	--
Beryllium	10.4	1.51[c]	1.51[c]	0.032 U	0.032 U	0.031 U	0.034 U	--
Boron	7,200	320	--[g]	0.96 U	0.95 U	1.3 B	1.3 B	--
Cadmium	13.9	0.81[c]	0.81[c]	0.047 B	0.041 B	0.062 B	0.20	--
Chromium, Total	80,000	18.5[c]	18.5[c]	8.1 X	3.8 X	12.8 X	8.5 XM	--
Chromium VI	2.1	4.8	2	0.154 U	0.154 U	0.155 U	0.154 U	--
Cobalt	24	15.7[c]	--[g]	8.7 X	10.2 X	5.8 X	10.0 X	--
Copper	2,960	59.2	22.0[c]	16.5 X	16.8 X	11.0 X	20.1 X	--
Lead	353	10.2[c]	10.2[c]	2.9	2.5	5.6	47.7 XNM	--
Lithium	160	33.5[c]	--[i]	--	--	--	--	--
Manganese	3,760	512[c]	512[c]	267 X	296 X	218 X	335 X	--
Mercury	24	0.33[c]	0.33[c]	0.0058 U	0.0058 U	0.0056 B		--
Methyl Mercury	8	0.16	0.16	--	--	--	--	--
Molybdenum	400	8	--[g]	0.48 B	0.43 B	0.27 B	0.83 B	--
Nickel	1,600	19.1[c]	27.4	11.9 X	6.8 X	**20.9 X**	11.7 X	**GW**
Selenium	400	5	1	0.84 U	0.83 U	0.82 U	0.93 B	--
Silver	400	8	0.73[c]	0.16 U	0.15 U	0.15 U	0.16 U	--
Strontium	48,000	960	--[g]	--	--	--	--	--
Thallium	5.6	0.5[b]	0.5[b]	--	--	--	--	--
Tin	48,000	960	--[g]	--	--	--	--	--
Uranium (soluble salts)	240	3.21[c]	3.21[c]	--	--	--	--	--
Vanadium	560	85.1[c]	--[g]	59.3 X	66.8 X	44.2 X	57.6 X	--
Zinc	24,000	480	67.8[c]	44.2 X	43.1 X	36.3 X	**77.8 X**	**RP**
TPH								
Diesel Range Organics (C10-C36)	200	200	200	5.60	0.990 U	**14000 D**	180.0 N	**D, GW, RP**
Motor Oil (C10-C28)	200	200	200	2.70 J	0.670 U	**8100 D**	120.0 N	**D, GW, RP**

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Volatile Organics								
Acetone	72,000	720	--	0.037	0.020	0.037	0.0091 J	--
Carbon Tetrachloride	7.69	0.0337	0.05	0.00063 U	0.00060 U	0.00063 U	0.00055 U	--
Methylene Chloride	133	0.5	0.94	0.0021 JB	0.0017 JB	0.0017 JB	0.00087 JBT	--
Toluene	6,400	64	1,360	0.00069 U	0.00066 U	0.00069 U	0.00061 U	--
Xylene	16,000	160	--	0.00061 U	0.00058 U	0.00061 U	0.00054 U	--
Semivolatiles								
Acenapthene	4,800	96	129	0.013 J	0.011 U	1.100 UD	0.130 JT	--
Acenapthylene [e]	4,800	96	129	0.00017 U	0.018 U	1.700 UD	0.017 U	--
Anthracene	24,000	240	1,920	0.027 J	0.018 U	1.700 UD	0.610 T	--
Benzo(a)anthracene	1.37	0.015[b]	0.015[b]	**0.092 J**	0.021 U	**3.900 JD**	**1.8000**	**D, GW, RP**
Benzo(a)pyrene	0.137	0.015[b]	0.015[b]	**0.084 J**	0.021 U	**6.400 JD**	**1.000**	**D, GW, RP**
Benzo(b)fluoranthene	1.37	0.015[b]	0.015[b]	**0.130 J**	0.027 U	**2.700 JD**	**1.800 K**	**D, GW, RP**
Benzo(k)fluoranthene	1.37	0.015[b]	0.015[b]	0.040 U	0.041 U	4.100 UD	0.040 UK	**GW, RP**
Benzo(g,h,i)perylene [e]	2,400	48	192	0.047 J	0.017 U	7.000 JD	0.480	--
Bis(2-chloro-1-methylethyl) ether	14.3	0.33[b]	7.5	--	--	--	--	--
Bis(2-chloroethoxy)methane [e]	0.909	0.33[b]	0.33[b]	0.023 U	0.024 U	2.400 UD	0.023 U	
Bis(2-chloroethyl) ether	0.909	0.33[b]	0.33[b]	0.017 U	0.017 U	1.700 UD	0.016 U	
Bis(2-ethylhexyl)phthalate	71.4	0.6	0.36	0.072 JB	0.073 JB	**8.400 JBD**	0.140 JB	**GW, RP**
Bromophenylphenyl ether; 4-	--	--	--	0.019 U	0.020 U	1.900 UD	0.019 U	--
Butylbenzylphthalate	16,000	320	250	0.043 U	0.045 U	4.400 UD	0.043 U	--
Carbazole	50	0.438	--	0.036 U	0.037 U	**3.70 UD**	0.250 JT	**GW**
Chloro-3-methylphenol; 4- [f]	4,000	80	--	0.066 U	0.068 U	6.800 UD	0.065 U	--
Chloroanilene; 4-	320	6.4	--	0.082 U	0.085 U	8.400 UD	0.081 U	--
Chloronaphthalene; 2-	6,400	64	206	0.010 U	0.010 U	1.000 UD	0.0099 U	--
Chlorophenol;2-	400	4	19.34	0.021 U	0.022 U	2.200 UD	0.021 U	--
Chlorophenylphenyl ether; 4-	--	--	--	0.021 U	0.022 U	2.200 UD	0.021 U	--
Chrysene	13.7	0.12	0.1[b]	0.120 J	0.028 U	2.800 UD	**1.600**	**GW**
Dibenz(a,h)anthracene	1.37	0.03[b]	0.03[b]	0.019 U	0.020 U	1.900 UD	0.019 U	--
Dibenzofuran	160	3.2	--	0.20 U	0.021 U	2.000 UD	0.047 J	--
Dichlorobenzene; 1,2-	7,200	60	540	0.22 U	0.023 U	2.300 UD	0.022 U	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Semivolatiles								
Dichlorobenzene; 1,3-	2,400	24	80	0.12 U	0.012 U	1.200 UD	0.012 U	--
Dichlorobenzene; 1,4-	41.7	0.33[b]	0.972	0.014 U	0.014 U	1.400 UD	0.013 U	--
Dichlorobenzidine; 3,3-	2.22	0.33[b]	0.33[b]	0.090 U	0.093 U	9.200 UD	0.089 U	--
Dichlorophenol; 2,4-	240	4.8	18.6	0.010 U	0.010 U	1.00 UD	0.0099 U	--
Diethylphthalate	64,000	1,280	4,600	0.072 JB	0.075 JB	5.800 JBD	0.026 U	--
Dimethylphthalate	80,000	1,600	14,400	0.023 U	0.024 U	2.400 UD	0.023 U	--
Dimethylphenol; 2,4-	1,600	32	110.6	0.066 U	0.068 U	6.800 UD	0.065 U	--
Di-n-butylphthalate	8,000	160	540	0.029 U	0.030 U	3.000 UD	0.150 J	--
Di-n-octylphthalate	1,600	32	--	0.014 U	0.015 U	1.500 UD		--
Dinitro-2-methylphenol; 4,6-	8	0.33[b]	--	0.330 U	0.340 U	34.000 UD	0.330 U	--
Dinitrophenol; 2,4-	160	3.2	14	0.330 U	0.350 U	34.000 UD	0.330 U	--
Dinitrotoluene; 2,4-	160	3.2	0.33[b]	0.066 U	0.068 U	6.800 UD	0.065 U	--
Dinitrotoluene; 2,6-	80	1.6	136	0.028 U	0.029 U	2.900 UD	0.028 U	--
Ethylene glycol	160,000	320	--	--	--	--	--	--
Fluoranthene	3,200	64	18	0.210 J	0.037 U	3.700 UD	4.00	--
Fluorene	3,200	64	260	0.018	0.019 U	1.800 UD	0.130 J	--
Hexachlorobenzene	0.625	0.33[b]	0.33[b]	0.029 U	0.030 U	3.000 UD	0.029 U	--
Hexachlorobutadiene	12.8	0.33[b]	0.33[b]	0.010 U	0.010 U	1.000 UD	0.0099 U	--
Hexachlorocyclopentadiene	480	5	48	0.050 U	0.052 U	5.100 UD	0.049 U	--
Hexachloroethane	71.4	0.313	0.38	0.021 U	0.022 U	2.200 UD	0.021 U	--
Hydrazine	0.333	0.33[b]	--	--	--	--	--	--
Indeno(1,2,3-cd) pyrene	1.37	0.33[b]	0.33[b]	0.040 J	0.023 U	2.300 UD	0.460	--
Isophorone	1,050	9.21	1.68	0.017 U	0.018 U	1.700 UD	0.017 U	--
Methylnaphthalene; 2-	320	3.2	--	0.019 U	0.020 U	1.900 UD	0.019 U	--
Methylphenol; 2- (cresol;o-)	4,000	80	--	0.013 U	0.013 U	1.300 UD	0.013 U	--
Methylphenol; 4- (cresol;p-)	400	8	--	0.033 U	0.034 U	3.400 UD	0.033 U	--
Naphthalene	1,600	16	988	0.013 U	0.032 U	3.200 UD	0.031 U	--
Nitroaniline; 2-	240	2.4	--	0.050 U	0.052 U	5.100 UD	0.049 U	--
Nitroaniline; 3-	24	0.33	--	0.073 U	0.076 U	7.500 UD	0.072 U	--
Nitroaniline; 4-	47.6	0.33	--	0.073 U	0.075 U	7.400 UD	0.072 U	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Semivolatiles								
Nitrobenzene	160	1.6	3.4	0.022 U	0.023 U	2.300 UD	0.022 U	--
Nitrophenol; 2-	--	--	--	0.010 U	0.010 U	1.000 UD	0.0099 U	--
Nitrophenol; 4-	640	12.8	1,254	0.097 U	0.100 U	9.900 UD	0.096 U	--
Nitroso-di-n-propylamine;N-	0.33[b]	0.33[b]	0.33[b]	0.031 U	0.032 U	3.200 UD	0.031 U	--
Nitrosodiphenylamine;N-	204	1.79	1.946	0.021 U	0.022 U	2.200 UD	0.021 U	--
Pentachlorophenol	8.33	0.33[b]	0.33[b]	0.330 U	0.340 U	34.000 UD	0.330 U	--
Phenanthrene[e]	24,000	240	1,920	0.110 J	0.018 U	1.700 UD	1.700	--
Phenol	24,000	480	4,200	0.018 U	0.019 U	1.800 UD	0.18 U	--
Pyrene	2,400	48	192	0.210 J	0.013 U	9.100 JD	3.600 T	--
Tributyl Phosphate	185	3.3[b]	--	--	--	--	--	--
Trichlorobenzene; 1,2,4-	800	7	45.4	0.028 U	0.029 U	2.900 UD	0.028 U	--
Trichlorophenol; 2,4,5-	8,000	80	--	0.010 U	0.010 U	1.000 UD	0.0099 U	--
Trichlorophenol; 2,4,6-	90.9	0.795	0.42	0.010 U	0.010 U	1.000 UD	0.0099 U	GW, RP
Pesticides and PCBs								
Aldrin	0.0588	0.00165[b]	0.00165[b]	0.00027 U	0.00026 U	0.0026 UD	0.00024 U	--
BHC, alpha	0.159	0.00165[b]	0.00165[b]	0.00023 U	0.00022 U	0.0022 UD	0.00021 U	--
BHC, beta	0.556	0.00486	0.00554	0.00070 U	0.00070 U	0.0069 UD	0.00064 UN	--
BHC, delta	--	--	--	0.00043 U	0.00042 U	0.0042 UD	0.00038 UN	--
BHC, gamma (Lindane)	0.769	0.00673	0.0038	0.00049 U	0.00049 U	0.0048 UD	0.00045 U	--
Chlordane (alpha, gamma)	2.86	0.025	0.0165[b]	.00034 U	0.00034 U	0.0033 UD	0.00031 U	--
Dalapon	2,400	20	--	--	--	--	--	--
Db; 2,4-	640	12.8	--	--	--	--	--	--
DDD, 4,4'-	4.17	0.0365	0.0033[b]	0.00058 U	0.00057 U	0.0057 UD	0.00052 UN	--
DDE, 4,4'-	2.94	0.0257	0.0033[b]	0.00025 U	0.00025 U	0.0025 UD	0.00023 U	--
Pesticides and PCBs								
DDT, 4,4'-	2.94	0.0257	0.0033[b]	0.00063 U	0.00062 U	0.0061 UD	0.0095 JXD	--
Dicambra	2,400	48	--	--	--	--	--	--
Dichlorophenoxyacetic acid; 2,4-	640	7	--	--	--	--	--	--
Dichloroprop	640	7	--	--	--	--	--	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
Pesticides and PCBs								
Dichloroprop [e]	640	7	--	--	--	--	--	--
Dieldrin	0.0625	0.0033 [b]	0.0033 [b]	0.00022 U	0.00022 U	0.0022 UD	0.0020 UD	--
Dinoseb (DNBP)	80	0.7	--	--	--	--	--	--
Endosulfan (I, II, sulfate)	480	9.6	0.0112	0.00029 U	0.00018 U	**0.014 JXD**	0.00028 UN	**RP**
Endrin (and ketone, aldehyde)	24	0.2	0.039	0.00032 U	0.00051 U	0.030 XD	0.00047 UN	--
Heptachlor	0.222	0.002 [b]	0.002 [b]	0.00023 U	0.00022 U	**0.0022 UD**	**0.00023 JX**	**GW, RP**
Heptachlor epoxide	0.11	0.002 [b]	0.002 [b]	0.00045 U	0.00045 U	**0.0044 UD**	**0.0029 XN**	**GW, RP**
Methoxychlor	400	4	1.67	0.00048 U	0.00047 U	0.0047 UD	0.0043 UD	--
MCPP [2-(2-Methyl-4-Chlorophenoxy) Propionic Acid]	80	10 [b]	164	--	--	--	--	--
Polychlorinated Biphenyls	0.5 [h]	0.017 [b]	0.017 [b]	--	--	--	--	--
PCB Aroclor-1016	0.5	0.017 [b]	0.017 [b]	0.0029 U	0.0029 U	0.0029 U	0.0027 U	--
PCB Aroclor-1221	0.5	0.017 [b]	0.017 [b]	0.0085 U	0.0084 U	0.0083 U	0.0079 U	--
PCB Aroclor-1232	0.5	0.017 [b]	0.017 [b]	0.0021 U	0.0021 U	0.0021 U	0.0020 U	--
PCB Aroclor-1242	0.5	0.017 [b]	0.017 [b]	0.0049 U	0.0049 U	0.0048 U	0.0046 U	--
PCB Aroclor-1248	0.5	0.017 [b]	0.017 [b]	0.0049 U	0.0049 U	0.0048 U	0.0046 U	--
PCB Aroclor-1254	0.5	0.017 [b]	0.017 [b]	0.0027 U	0.0027 U	0.0027 U	**0.077**	**GWP, RP**
PCB Aroclor-1260	0.5	0.017 [b]	0.017 [b]	0.0027 U	0.0027 U	0.0027 U	**0.044 N**	**GWP, RP**
Silvex (tp;2,4,5-)	640	5	--	--	--	--	--	--
Toxaphene	0.909	0.2 [b]	0.2 [b]	0.017 U	0.017 U	0.160 UD	0.150 UD	--
Trichlorophenoxyacetic acid;2,4,5-	800	16	--	--	--	--	--	--

Contaminant	Soil Cleanup Levels (mg/kg)[a]			Sample Results (mg/kg) and Laboratory Result Qualifier				
				J1JCH0	J1JCH1	J1JCH2	J1JCF9	
	Direct Exposure (DE)	Ground-water Protection (GWP)	River Protection (RP)	Stained Soil N 149373 E 571265	Soil near concrete structure N 149386 E 571286	Black material N 149387 E 571278	Soil from staging pile area N 149762 E 571326	Cleanup Level Exceeded
PAH								
Naphthalene	1,600	16	988	0.013 U	0.013 U	0.100 JD	0.058 UD	--
Acenapthylene	4,800	96	129	0.0064 U	0.0095 U	0.046 UD	0.043 UD	--
Acenapthene	4,800	96	129	0.010 U	0.011 U	0.051 UD	0.048 UD	--
Fluorene	3,200	64	260	0.022 JX	0.0056 U	0.027 UD	0.990 D	--
Phenanthrene	24,000	240	1,920	0.160	0.013 U	0.061 UD	5.80 D	--
Anthracene	24,000	240	1,920	0.054	0.0032 U	0.016 UD	2.30 D	--
Fluoranthene	3,200	64	18	0.290	0.014 U	0.066 UD	9.50 D	--
Indeno(1,2,3-cd) pyrene	1.37	0.33	0.33	0.074	0.013 U	0.061 UD	1.70 D	--
Pyrene	2,400	48	192	0.350	0.013 U	0.580 DX	10.0 D	--
Benzo(a)anthracene	1.37	0.015[b]	0.015[b]	**0.160**	0.0034 U	**0.016 UD**	**4.50 D**	**D, GW, RP**
Chrysene	13.7	0.12	0.1	**0.140**	0.0051 U	**0.740 XD**	**3.60 D**	**GW, RP**
Benzo(b)fluoranthene	1.37	0.015[b]	0.015[b]	**0.089 X**	0.0044 U	**1.100 DX**	**2.30 D**	**D, GW, RP**
Benzo(k)fluoranthene	1.37	0.015[b]	0.015[b]	**0.057**	0.0042 U	**3.200 D**	**1.40 D**	**D, GW, RP**
Benzo(a)pyrene	0.137	0.015[b]	0.015[b]	**0.140**	0.0068 U	**0.033 UD**	**2.90 D**	**D, GW, RP**
Dibenz(a,h)anthracene	1.37	0.03	0.03	0.020 JX	0.012 U	**0.056 UD**	**0.360 DX**	**GW, RP**
Benzo(g,h,i)perylene	2,400	48	192	0.038 X	0.0076 U	0.037 UD	0.640 DX	--

[a] Soil cleanup levels in this table are obtained from Table B-4 and B-7 of Appendix B of the *100 Area Remedial Design Report/Remedial Action Work Plan* (100 Area RDR/RAWP) (DOE-RL 2009). Radionuclide soil activities protective of groundwater and the river were calculated using RESRAD Version 6.4 (ANL 2007) assuming that no uncontaminated vadose zone exists between the contaminated zone and groundwater. Nonradionuclide soil concentrations protective of groundwater and the river are based upon application of the "100 times" rule (Ecology 1996).

[b] Where cleanup levels are less than RDLs, cleanup levels default to RDLs per WAC 173-340-707(2) (Ecology 1996). The cited RDLs are based on EPA-approved analytical methods that may not be available for rapid turnaround analyses. Prior notification and concurrence with the laboratory may be necessary to analyze to meet this RDL. Actual detection limits may differ from any RDL.

[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700[4][d] (1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement Project Managers as discussed in Section 2.1.2.1 of the 100 Area RDR/RAWP (DOE-RL 2009).

[d] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[e] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], 1996) using an airborne particulate mass-loading rate of 0.0001 g/m^3 (WDOH 1997).

[f] Toxicity data for this chemical are not available. Cleanup levels are based on surrogate chemicals:
Contaminant: acenapthylene; surrogate: acenapthene
Contaminant: benzo(g,h,i)perylene; surrogate: pyrene
Contaminant: bis(2-chloroethoxy)methane; surrogate: bis(2-chloroethyl)ether
Contaminant: chloro-3-methylphenol; 4-; surrogate: methylphenol; 3-
Contaminant: dichloroprop (pesticide); surrogate: dichlorophenoxyacetic acid; 2,4-; (2,4-D)
Contaminant: phenathrene; surrogate: anthracene

[g] No parameters (bioconcentration factors or AWQC values) are available from the Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730(3)(a)(iii), 1996 [Method B for surface waters]).

[h] The soil cleanup value for PCBs is based on the formula presented in WAC 173-340-740(3)(a)(iii)(B) (1996), and the cancer potency factor for ingestion of PCBs of 2.0 kg-day/mg (soils) from the EPA Integrated Risk Information System (IRIS) on the internet at < http://www.epa.gov/iris >.

-- Not analyzed for, or not applicable.
B Analyte was found in the associated method blank as well as in the sample.
D Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples
J Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
K Benzo (b&k) fluoranthene are unresolved due to matrix, result is reported as Benzo(b fluoranthene.
M Sample duplicate precision not met.
N Recovery exceeds upper or lower control limits
T Matrix spike and matrix spike duplicate; Recovery exceeds upper or lower control limits.
U Analyzed for but not detected.
X Serial dilution in the analytical batch indicates that physical and chemical interferences are present.

Soil Cleanup Level source: DOE-RL, 2006b, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area,* DOE/RL-2005-93, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Attachment 12

300 Area Closure Project Status
January 12, 2012
100/300 Area Combined Unit Manager Meeting

Ongoing Activities

- 324 – Remediation evaluation study published, with DOE Technical Assistance Group..
- 309 – Completed above-grade demolition, turn over to subcontractor for reactor removal.
- 340 – Completed above-grade demolition of complex facilities and turn over to subcontractor. Waste site remediation has been initiated.
- Completing remediation of 321 and 3706 waste site areas.
- Preparing to place source term array and grout sources in 3730 Gamma Irradiation Facility.

Current Demolition Preparations & Activities

- Commence 308 demolition.
- Continue preparations for 309 reactor core removal.
- Complete 320 building demolition.
- Complete 337-B caisson asbestos abatement and backfill site.
- Prepare procurement for subcontractor waste site remediation services south of Apple St.

60-Day Project Look Ahead

- Continue 340 Complex waste site remediation and finalize engineering for vault removal.
- Initiate demolition of 308. Finalize engineering for TRIGA reactor removal.
- Complete below-grade demolition and backfill of 320 Building.
- Complete 327 below-grade demolition.
- Complete work at the 337 Complex, backfill and close area.
- Initiate north of Apple (Zone 7) process sewer remediation.
- Complete remediation of 321 and 3706 remediation areas.

Attachment 13

Environmental Protection Mission Completion Project
January 12, 2012

Orphan Sites Evaluations

- The 100-F/IU-2/IU-6 Area – Segment 5 Orphan Sites Evaluation Report, Rev. 0 was transmitted to RL on12/20/11.

Long-Term Stewardship

- RL review comments on the consolidated Draft, 100-F/IU-2/IU-6 - Segment 2 turnover and transition package is currently being incorporated.
- Continue drafting of the 100-F/IU-2/IU-6 – Segment 3 turnover and transition package, and interim remedial action reports.

River Corridor Baseline Risk Assessment

- The Draft C Ecological Risk Assessment report (Volume I) regulator review period has ended. EPA/Ecology did not comment directly on the report, instead focusing on review of the 100-K RI/FS and proposed plan. None of the EPA or Ecology comments on the 100-K reports directly affected the RCBRA Draft C Ecological Risk Assessment. The RCBRA is being finalized and will be issued as a Rev 0 document with no significant changes.

Remedial Investigation of Hanford Site Releases to the Columbia River

- Regulator comments on the Draft A screening level ecological risk assessment were received on December 27. Comment review and incorporation were initiated. Comment resolution meetings are being planned.
- The Draft A human health risk assessment was delivered to DOE on January 4, 2012 for initiation of the regulator review.

Document Review Look-Ahead

Document	Regulator Review Start	Duration
Columbia River Component Risk Assessment – Baseline Human Health Risk Assessment Report (DOE/RL-2010-117, Draft A, Volume II)	January 2012	45 days